ISTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

COLLABORATION IN DESIGN STUDIOS

M.Sc. Thesis by
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Department: Architecture

Programme: Architectural Design

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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ FEN BİLİMLERİ ENSTİTÜSÜ

TASARIM STÜDYOLARINDA İŞBİRLİĞİ

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FOREWORD

I have lived in London for two years and within this period I studied in the AA and then worked with Zaha Hadid Architects. The experience I had was totally different than what I have imagined and heard so far. I think, it was the great turn in my life and I thought I should share it with everybody in the design world in order to get their opinions about these new approaches. This thesis has given me the chance to achieve this. The two common things that I have experienced both in the educational world and the professional practice, was collective design environments.

First of all, I would like to thank to my professor Assoc. Prof. Turkan Ulusu Uraz for the endless support and wisdom she has given me, since the first years of my architectural education. Also I would like to thank to Meltem Aksoy, for her comments at the crucial moments of this process. I would like to thank to all my family for their endless support in making my dreams come true. And last, but not the least, my colleagues from ITU Architecture Faculty, Pro-Plan family, my dearest friends and Fred for being here beside me always and forever.

26 December 2004 Muge BELEK FIALHO TEIXEIRA, M.Arch

CONTENTS

ABBREVIATIONS

AA	: Architectural Association School of Architecture
AADRL	: Architectural Association Design Research Laboratory
AD	: Architectural Design Magazine
BC	: Before Christ
CAD-CAM	: Computer aided design- computer aided manufacturing
CNC	: Computerized Numerical Control
DRL	: Design Research Laboratory
FOA	: Foreign Office Architects
GLForm	: Greg Lynn Form
ITU	: Istanbul Technical University
LAN	: Local area network
MArch	: Master of Architecture
RIBA	: Royal Institute of British Architects
RRP	: Richard Rogers Partnership
SOM	: Skidmore Owings & Merrill
www	: world wide web
ZHO	: Zaha Hadid Office
9/11	: September Eleven; the attack to the twin towers

TABLE LIST

ILLUSTRATIONS LIST

TASARIM STÜDYOLARINDA İŞBİRLİĞİ

ÖZET

Günümüz koşullarındaki mimari ortamın getirdiği ve gerektirdiği değişimler göz önüne alınarak mimari tasarım stüdyolarındaki eğitim formasyonunun gelişimi ve değişimi bu çalışmanın çıkış noktasını oluşturmuştur. Tezin giriş bölümünde günümüzün mimarlık ortamı çeşitli yönleriyle tanıtılarak, mimarlık eğitimine yansımaları ele alınmıştır. Bu yansımalar ışığında yazarın hem öğrenci olarak (AADRL 01-03) hem de eğitmenlerden biri olarak (ITU MTZ Ekim 04- Ocak 05) katıldığı iki farklı yükseklisans programı tanıtılmıştır. Bu iki stüdyo ortamı, öğrencinin tasarım stüdyosundaki konumu göz önünde bulundurularak 'bireye' ve 'işbirliğine' dayalı tasarım stüdyoları şeklinde sınıflandırılmıştır. Tezin kuramsal çerçevesini desteklemek ve işbirliğine dayalı stüdyoların pozitif ve negatif yanlarını ortaya çıkartmak için bir anket hazırlanmıştır. Anket AADRL 01-04 dönemlerinde okumuş olan iki sınıf üzerinde uygulanmıştır.

İkinci bölüm kapsamında mimarlık dünyasındaki güncel tartışmalara hem meslek alanı, hem mimarlığın nesnesi, hem de eğitim çerçevesinde bakılmıştır. Mimarlığın ve insanlığın bugüne kadarki tarihçelerine bakıldığı zaman, etkileşimlerin olduğu görülmektedir. Günümüzün teknolojik gelişimleri ile yaşam tarzımızın değişiminin mimarlığa etkisi de şüphesizdir. Bugün bilgisayar teknolojileri ve basit tasarım programları sayesinde herkesin mimarlık yapabilme yetisine sahip olması, mimarlığın ayağa düşmesine neden olmuştur. Mimarinin güncel tartışmalar içinde yer almakta zorlanması ve prestijini kaybetmesi, kendini yenilemesi gerekliliğini ortaya koymaktadır. Bu sebeple mimarların yeni teknolojileri kullanarak, gelenekselin ötesinde tasarımlar yapmaları gerekmektedir. Meslekler arası teknoloji alışverişi ile yeni tasarımların gerçekleşmesi ve bu yeni tanımlanan süreç sırasında tasarımın bilgi bazlı olması gerekliliği ön plana çıkmaktadır.

Tabii bütün bu değişimlerle mimarın da mesleğe bakış açısı değişmeye başlamıştır. 'Mimarlık nedir?' sorusunun yerini 'mimarlık ne yapar sorusu? almıştır. Bu soruyu yönelten mimarlar, mesleğin gücünü ortaya koyarak eski prestijli konumuna ulaştırmaya başladılar. Bu bakış açısında, günümüzde mimarın rolü de tartışılmaktadır. Mimarinin tarihsel süreçte geçmişten günümüze tanımına bakıldığında, günümüzde üründen başka tasarım sürecinin de bilgi olarak önem kazandığını görürüz. Bu, yeni tasarım rollerinin oluşmasına ve mesleğin çatallaşmasına sebep olurken, mimarın toplum içindeki görevlerini tanımlamakta güçlük çekmesine neden olmaktadır. Mimarın, bu süreçte toplumu yönlendiren özelliğinden çıkıp toplum tarafından yönlendirilen hale geldiği gözlemlenmektedir. Mimarın bunu aşması için çağın ötesine geçebilen bir özelliğe sahip olması gerekir ki bu da ancak araştırıcı bir kişilikle olabilir.

Günümüzde, mimarın kullandığı tasarım araçlarının değişimi ofis ortamlarına da yansımaktadır. Mimarlar, dünyanın farklı noktalarında iş alabilmek için çokuluslu

organizasyonlar oluşturmaya başladılar. Bu tip organizasyonların avantajlarından biri iş zamanlaması ile ilişkili olarak ortaya çıkmaktadır. Coğrafi konumları sebebiyle yirmi dört saat çalışabilen ofisler, az zamanda çok iş yapılabilmesini sağlamaya başlamıştır. Tabii çokuluslu luk durumunda akreditasyon gibi meseleler ön plana çıkmaya başlıyor.

Mimari ürünün tanımı da, bugünün koşullarının ve toplumun mekanla ilgili beklentilerinin değişimi ile farklılaşmaktadır. Bu beklentilerin keşfi için mimarlara önemli görevler düşmektedir. Bugün insanlığın yaşadığı mekanların çoğunu kentler tanımlamaktadır ve yaşam tarzımız değiştikçe de dünya nüfusunun çoğu kentlere taşınmaktadır. Bunun sonucunda mimarlara çok önemli sorumluluklar düşmektedir. Bugünün mekan tanımı geçmişe göre daha belirsiz, akışkan ve bulanık bir yapıya sahiptir. Bu tip mekanlara uyum sürecinde mimarinin oluşumunda hareketin ön plana çıktığı gözlemlenmektedir.

Günümüzün oluşturduğu bir başka koşul da, tasarıma ilgili birçok ürün gibi mimari ürünün de hızla tüketilmesidir. Bunun gibi bir piyasa ortamında, hızlı tasarlayan mimar kendine daha kolay yer edinebiliyor. Piyasanın hızına yetişebilmek için bilgi üretiminin de hızlanması ve zenginleşmesi gerekmektedir. Farklılaşmak ve ön plana çıkmak için daha değerli tasarımların yapılması gerekiyor. Bilgi bazlı tasarımlar ve tasarım süreci önem kazanıyor. Bu tip tasarımların ortaya çıkabilmesinde grup çalışması gerekmektedir. Grup çalışmaları ancak somut veriler üzerinden yapılabilir. Bu da mimari objenin tasarımtartışmalarında ön plana çıkmasına neden olmaktadır.

Bugün mimarlığın yaşadığı problemler de mimari eğitimle birebir alakalıdır. Günümüzde eğitimle ilgili tartışmaların çoğu, mimari eğitimde araştırma ve uygulamanın ayrışması üzerinedir. Bunun sebeplerinden biri mimarın akademik bir ortamda yetişmesi ile ilgilidir. Akademik ortamlarda bile bu ayrım 'uygulamacı' ve 'araştırmacı' eğitmen kavramlarıyla ön plana çıkmaktadır. Mimari eğitimin bugün sadece uygulamacı mimar yetiştirme amacı, günümüz koşullarında yetersiz kalmaktadır. Çağımızda araştırmacı ve bilimadamı kişiliğindeki mimarların eğitilmesi gerekliliği ön plana çıkmaktadır. Aslında, araştırmanın tasarımda ön plana çıkması akademi ve uygulamayı da bir araya getirebilir. Kollektif çalışma ortamlarıyla bu rahatlıkla sağlanabilir.

Tartışmaların bir diğer noktası da mimarların mesleki kimliklerini sanat alanında mı yoksa bilim alanında mı ifadelendireceklerine bir türlü karar verememeleri ile ilgilidir. Mimarların kafasındaki karmaşıklık diğer meslekların mimariye bakış açısını da etkilemektedir. Mimarlığın diğer mesleklerle olan ilişkilerini düzeltmesi gereklidir çünkü mimarlık hem multidisipliner olarak, hem de kendi içinde kollektif bir meslek karakterine sahiptir. Diğer meslekler mimarlığı hor görmektedir ve bu akademik ortama da yansımaktadır. Bu problemi çözmek için eğitimde multidisipliner bir ortam yaratmak gereklidir. Mimarlık eğitimi bugünkü haliyle birçok tepki almaktadır. Hem disiplinlerarası çalışmalara kolay uyum sağlayabilen, hem de çağımızın gereklerine mezun olduktan sonra bile adapte olabilen mimarlar yetiştirmek için yeni mimari eğitim yöntemlerine ihtiyaç duyulmaktadır. Bu da ancak araştırma bazlı bir eğitim modeli olan işbirliğine dayalı çalışma ile mümkün olabilir.

Günümüzdeki tartışmalara kısaca göz attıktan sonra tezin üçüncü bölümünde mimarlık eğitiminin dayandığı temel ilkeler sınıflandırılmıştır. Bu bakış açısında, mimari eğitimin tarihçesi, usta-çıraktan enstitüleşmeye kadar olan süreçte ele

alınmıştır. Bu süreçte gözlenen unsur mimari eğitiminin temel taşının tasarım stüdyolarının oluşturduğudur. Bu sebeple de mimari eğitimde stüdyonun yerine tarihçesiyle beraber bakıp, öğrencinin konumuna göre farklı tasarım stüdyo tipleri ortaya konulmuştur. Bunlar 'bireysele' ve 'işbirliğine' dayalı tasarım stüdyoları olarak tanımlanabilir.

Mimarlık eğitiminin tarihçesine bakıldığında en etkili olan ikili Bauhaus ve Beaux-arts okullarıdır. Beaux-arts ve Bauhaus eğitimlerinin tanımı ve ortak yönleri, bugünkü eğitim sisteminin temellerini oluşturur. Bunların yanında tarihte önemli bir yere sahip olan bir başka ekol da AA'dır. AA'nın eğitim sisteminin tanımı ve güncelde yaşadığı problemler, bugünün mimarlık mesleğinin daha farklılaştığını, multidisipliner ve işbirliğine dayalı bir yapıya ulaştığını ortaya koymaktadır.

Tasarım süreci soyuttan somuta doğru giden ve doğrusal olmayan bir süreçtir. Bu süreci daha iyi anlamak amacıyla stüdyo ortamına bakılmıştır ve tasarım sürecini oluşturan; fikirler, tema, ana kavram, bunları ifadelendiren betimleme, projenin gelişimini sağlayan eleştiri ve proje geliştirme konuları işlenmiştir.

Tasarım bilgisi stüdyoda oluşur ve kullanılır. Amacı fikirlerin arkasındaki ana konsepti oluşturmaktır. Tasarım bilgisine ulaşmanın yolları tasarım stüdyolarında öğretilir. Önemli olan öğrencinin doğru soruları sormayı öğrenebilmesidir. Ancak bu yolla öğrencinin tasarımcı gibi düşünmesi sağlanabilir, çünkü 'tasarımcı düşünce' doğru soruları sormakla başlar.

Mimarlar kendilerini iki boyutta (çizimlerle ve diyagramlarla) ve üç boyutta (maketlerle ve üç boyutlu çizimlerle) ifade ederler. Mimar düşüncelerini görselleştirerek tasarımyapar. Yaratıcı düşünce görselleştirme ile ortaya çıkar. Soyut düşünceler eskiz, diyagram yada tasarım önerisi şeklinde betimlenir ve tasarımın ilk evrelerinde gerçekleşir. Bazen sadece düşünceleri ortaya koyma şeklinde de üretim yapılabilir. Tasarım sürecinin bir parçası olan betimlemeler, içerdikleri bilgiye göre değişirler. İçerdikleri bilgi fazlalaştıkça detaya inerler. Tasarım sürekli bir süreçtir ve incelendiğinde değişik aşamalarda tasarımın geliştiği gözlenebilir.

Tasarım değerlendirme ile gelişir. Tasarımın farklı aşamalarında yapılan değerlendirmelerle kararlar alınır. Değerlendirme eleştiri demektir. İki şekilde olabilir, öz eleştiri ve eleştiri. Kişi, projesi yada fikirleri hakkında konuşarak öz eleştiri yapabilir. Öz eleştiri projede geri dönüşlerin olmasına olanak verir.

Tasarımı geliştirmek tasarım sürecinde önemli bir rol oynar. Önemli olan tasarımları geliştirecek olan doğru bilgiye ulaşmaktır, bu da ancak iyi araştırma yapmakla başarılabilinir. Mimari programlarda teorik dersler bu bakışla ön plana çıkmaktadır ve stüdyo ortamını beslemektedir.

Tasarım sürecini tanımlayan bu başlıkların herbirinde konu bireysele ve işbirliğine dayalı stüdyolara göre ayrı ayrı ele alınmıştır, çünkü her ikisinde de farklı şekilde gerçekleşmektedir.

Tasarım süreci kadar tasarım stüdyosunu oluşturan bireyler de önemlidir. Üçüncü bölüm, tasarım stüdyosunu oluşturan bireylerin tanımlanması ile sonlanmaktadır. Tasarım stüdyosunun, eğitmen, öğrenci ve bilgisayar gibi birbirinden farklı bireylerden oluşan karmaşık bir yapısı vardır. Bilgisayar bu yapıda çağımızın

getirdiği bir yenilik olarak ön plana çıkmaktadır. Eğitmen tasarımda daha tecrübeli olan, gerektiğinde öğrenciye yardımcı olan, projenin gidebileceği noktaları kestirebilen, projeye dışarıdan bakan bir gözdür. Görevini konuşarak gerçekleştirir. Öğrencinin yapmak istediklerini anlayıp onlara yardımcı olur. Tasarım yapmayı öğretemez ama uygun koşullu ortamı hazırlar. Bugünkü bilgi ortamındaki patlama, eğitmenlerin işini zorlaştırmaktadır ve eğitmenler ortak çalışmalar aracılığıyla bununla baş etmektedirler. Bunun yanında öğrenciler, öğrenmeye hevesli olan bireylerdir. Onların üzerlerine düşen görevler, tasarım yaparken öğrenmektir, bunu yaparken mimarlığı yaşamın bir parçası olarak benimsemeleri gerekir. En yeni birey olarak bilgisayar, tasarımın her adımında kullanılması gereken ve bilgiyi dönüştürme özelliği olan bir makinadır. Bilgisayarın kullanımı tasarım eğitiminin ilk yıllarında tehlikeli olmakla beraber mimari tasarım sürecinde çığır açtığı için kullanılması şarttır.

Tezin dördüncü bölümünde, 'bireysele' ve 'işbirliğine' dayalı yüksek lisans tasarım stüdyoları, stüdyoyu oluşturan bireyler arasındaki ilişkiler göz önünde bulundurularak anlatılmıştır.

Bireysele dayalı tasarım stüdyoları, bireysel çalışmanın ön planda olduğu stüdyolardır. Bu tip stüdyolarda:

- eğitmen- öğrenci ilişkisi: dört farklı şekilde gerçekleşmektedir. Birincisi eğitmenin tek yürütücü olarak tasarım stüdyosunu yürüttüğü oluşumlardır. İkincisi havuz sistemidir. Bu sistemde öğrenciler birey olarak farklı proje eğitmenlerini dolaşarak ayrı ayrı eleştiri alırlar. Üçüncü sistemde eğitmenler zaman zaman öğrenci gruplarını aralarında değiştirerek eleştiri verirler. Son sistemde, eğitmenler grup halinde proje dersine girerken, ortaklaşa eleştiri verirler.

- öğrenci - öğrenci ilişkisi: bireysel çabayla gerçekleşir. Kutuplaşma kaçınılmazdır, halbuki stüdyo ortamında öğrenme, eşit bireylerin karşılıklı diyalogları ile en iyi şekilde gerçekleşir.

- öğrenci - bilgisayar ilişkisi: bilgisayar sadece proje geliştirme ve sunum düzeylerinde kullanılıyor.

İşbirliğine dayalı tasarım stüdyoları, grup çalışmasının ve araştırmanın ön planda olduğu stüdyolardır. Diyagramlarla tasarım çalışmanın yöntemini oluşturur. Bu tip stüdyolarda:

- eğitmen- öğrenci ilişkisi: her öğrenci grubu projenin başlangıcında eğitmen grubuyla çalışmakla beraber zamanla projenin derinlemesine ele aldığı araştırma konusuna yakın olan eğitmenle çalışmaya devam eder. Hiyerarşik bir yapı söz konusu değildir, bu da öğrenci grubu ve eğitmen arasındaki diyaloğun verimli geçmesine olanak verir.

- öğrenci - öğrenci ilişkisi: eğitmen öğrenci ilişkisindeki gibi burada da bir hiyerarşi söz konusu değildir. Grup içindeki diyalog projenin başarısı için çok önemlidir. Öğrenci öğrenci ilişkisi üç önemli noktayla anlatılabilir. Bunlar: ayniyet; projeyi oluşturmada öğrencilerin aynı amaç yönünde hareket etmelerini, görev dağılımı; öğrencilerin ilgilerini çeken ve beceri sahibi oldukları konularda

çalışmalarını ve iletişim ortamı; öğrencilerin tasarım yaparken oluşturdukları ortam, kullandıkları dil ve diyagramlarla ilişkilidir.

- öğrenci grubu - öğrenci grubu ilişkisi: gruplar arasında yoğun bir düzeyde yarışma söz konusudur. Öğrenciler bilgilerine ve yeteneklerine göre gruplararası transferler gerçekleştirirler. Tasarımüzerinden kopya çekmek serbesttir.

- eğitmen- eğitmen ilişkisi: eğitmenler tasarım programını ortaklaşa oluştururlar. Stüdyoyu ortaklaşa yürütürler.

- öğrenci - bilgisayar ilişkisi: bilgisayar tasarımın her aşamasında kullanılıyor. Grubun bireyi haline dönüşmüş durumdadır.

Tasarım stüdyosunu oluşturan bireyler arasındaki ilişkilerle bu iki farklı yüksek lisans stüdyo yapısı anlatıldıktan sonra, iki stüdyonun oluşturdukları ortam, ürün ve süreç üzerinden yapılan karşılaştırmalarla ele alınmıştır.

Sonuç bölümünde, AADRL anket çalışmasının da desteklediği işbirliğine dayalı stüdyoların tasarım sürecine olumlu ve olumsuz katkıları irdelenmiştir. Günümüzün gerektirdiği araştırmaya dayalı tasarım için diyagramatik yöntemi ele alan bu tip stüdyolarının gerekliliği ortaya konulmuştur.

COLLABORATION IN DESIGN STUDIOS

SUMMARY

In this study, considering the changes and the needs of the architectural medium in today's conditions, the development and the change of the formation of education in the design studios is studied. In the introduction of the thesis, today's architectural medium is described with variable perspectives and its reflection towards architectural education is discussed. In the light of these reflections, the author's experience on attending as a student (AADRL 01-03) and as being one of the tutors (ITUMArch Oct. 04- Jan. 05) in two different post graduate courses are explained. Depending on the students' way of dealing with the projects, these two design studio structures are classified into ''individual'' and ''collaboration'' based design studio structures. In order to support the theoretical frame and to show the positive and the negative factors of collaboration based design studio structures, a questionnaire is prepared. The questionnaire is applied to two different classes of students from AADRL 01-04.

In the second chapter, through the current debates in the architectural world, the profession, the product and the educational frame of architecture are examined. When the history of architecture and of humanity is examined, an interaction is observed. Today's technological developments and the change in our life styles surely affect architecture. Today, computer technologies and simple design programs allow any common person to become capable of doing architecture, causing architecture to loose its respect. Architecture is having difficulties in taking its position in current discussions, loosing its prestige, shows the need for renewing itself. For this reason, by using new technologies architects should design something beyond traditional. New designs resulted from interdisciplinary relations, shows the importance of design being knowledge based in using technology.

Of course, because of all these changes, today's architectural point of view is also beginning to shift. The question of ' what architecture is?' has replaced its place to ' what the architects can do?' Architects that direct such a question, has started to expose the strength of architecture, placing it back to the level of recognition that it deserves. In this context, today architect's role is also being discussed. Looking at the history of architecture from the past till today, it is observed that today other than the product, the design process has also gained importance as knowledge. The architect is finding it difficult to define his role in the public, as the architects are now having difficulties in defining their duties in this separation of the profession. It is observed that their role is changing from the designer guiding the community to designer guided by the community. In order for architects to overcome this, they should have a specialty that would surpass the era, which requires a research based personality.

Today, the change of the architectural tools in design reflects on the design environments of an architect. Trying to get various jobs in different parts of the globe, they start to form international organizations. One of the advantages of these organizations is about timing of the work. As a consequence of their geographical positions, offices that work 24 hours, allow more work to be done in short time. Of course internationality brings the issues related to accreditation.

The definition of architectural product is also changing with today's conditions and the changes in the expectations of people. For the discovery of these expectations, architects have important duties. Today the order in the world is creating a pattern and architecture as a nature can be classified as a complicated profession in this chaotic order. Today, the spaces we live can be defined as cities, and the more our life styles change, the more people migrates to the cities. As a result of this, architects have important responsibilities. Comparing to the past, today's definition of space, is much more blurry, fluid and ambiguous. In the process of adapting to these spaces as architects, it is observed that motion is prior.

Today, like many of the other design products, architecture is consumed rapidly. Architects that design fast, finds it easier to place him in the market. For reaching the speed of the market, the knowledge generating should get richer and faster. In order to be different and step forward, more valuable designs should be made. Information based design and process comes forward. And for such deign environments, teamwork is essential. Teamwork can only be achieved through concrete information, which culminates on architectural object becoming the basis for discussions.

Today, the problems that architecture is facing, is in one to one relation to its education. Current discussions on architectural education, focuses on the split of research and practice. One of the reasons about this fact is about architects being raised in academic environments. Even in academic environments, the split of educator/tutor and practitioner/ tutor exists. Today, architectural education just focusing on the education of practitioner architect is insufficient and does not compete with the needs of our era. Today's architect should have a scientific and research based personality. Actually, research being prior aim in design, would allow the gathering of academics and practitioners. Through collaboration based environments this could easily be achieved.

Another point in the discussions is related to indecisive architects that cannot place the professions identity, either on science or arts. The complicated minds of the architects also affect the other disciplines ideas about architecture. Architecture should correct its relations with other disciplines, because it has a multidisciplinary and collective character of identity. Other professions treating architects bad, affects the academic field. In order to solve this problem, in education, it is necessary to create a multidisciplinary medium. Architectural education in today's conditions is being criticised by many people. There is a need for new architectural education methodologies, for educating architects that work in interdisciplinary fields easily and in order to adapt the needs of our era even after graduation. This can only be achieved through collaboration based design structures as a research based educational model.

After looking at the discussions of today briefly, in the third section of the thesis the basic principles of an architectural education are classified. With this vision, the history of architectural education, from apprenticeship to institutionalized form of education is exposed. From this study of the history, it is seen that the basic stone of architectural education is the design studio. For this reason, the design studio within its historical context is studied and by looking at the position of the student in different design studio structures, the postgraduate design studios are classified into two: 'individual' and 'collaboration' based design studios.

If the history of architectural education is looked at, the most efficient models would be defined as Bauhaus and Beaux-arts schools. The common features of these schools form the basis of the current architectural schools. Besides these, there were other institutions that were important as the AA. The definition of AA's education system and the problems that it is facing today shows that architectural education is changing and reaching to a level of interdisciplinary as well as collaborative structures.

The design process is a nonlinear process, going from abstract to concrete. In order to understand better this process, design studio medium is looked at and the topics that represent the process is defined as; main idea, concept, theme, for the visualization of these, representation, evaluation for the development of the project and development are explained. Design information is created and used in the studio. The aim is to find the main concept behind the ideas. The ways of reaching design knowledge is taught in a design studio medium. The important thing is to teach the students to ask the right questions. Only through this way, the student can be taught to 'think architecturally'.

Architects express themselves with two (drawings and diagrams) and three (models and animations) dimensional representations. Architects design through visualizing their thoughts. Creative thinking occurs through representations. Abstract thoughts take place in the beginning phase of the design, and then represented as sketches, diagrams or design proposals. Production can be made sometimes by just exposing thoughts. Representations being part of design process differ depending on the information they obtain. They become more detailed as the ideas behind them gets deeper. Design is a continuous process and if observed, it can be seen that in different levels the design improves.

Design develops with evaluations. Through evaluations in different stages of design, decisions are taken. Evaluation meaning critic could be done in two ways; self critic and critic. By talking about his/ her work or ideas, a student can evaluate her ideas. Self critic allows returning to the previous steps of the project.

Development design has an important role in the design process. The important thing is to reach to the right information for developing design, which can only be achieved through good research. Theoretical courses in architectural programmes, feeding the design studio, become more critical with this perspective.

In each of these titles, that define the design process, 'individual' and 'collaboration' based design studios are situated, as in each of them, the process differs.

As much as the importance of the design process, the individuals that form the design studio is also significant. The third section ends with the definition of the design studio members. The design studio has a complex structure that is composed of the tutor, the student and the computer. Computer is a new member that comes from our era. The tutor, who is more experienced in design, helps the student whenever it is necessary. The tutor has the potential to foresee where a project might lead, as well as evaluate it as an outsider. He has a role that is through verbal communication, understands the wishes of the students and helps them accordingly. A tutor cannot teach how to design, but in design studio environments, he/ she can only create a medium that would allow the students to learn how to design. The massive information explosion in today's world complicates the duty of the tutor, comparing to the past. In order to compete with today's needs of design studio tutoring; the tutors prefer to work in teams. One of the other members being the student is the one that is eager to learn. The student's duty is to learn while designing, which can only happen by seeing architecture as a part of their lives. And the most recent member computer is a tool that needs to be used in every aspect of the design process. Computer as a knowledge processor. Even though it is critical to use it, in the first years of design education, it is a must to use computers as they have revolutionized architecture, raising deep philosophical issues that are forcing a paradigm shift in the profession,

In the fourth section of the thesis, the 'individual' and the 'collaboration' based postgraduate studio structures are explained with the use of the interrelations of the members that form the design studios.

The individual design studio structures, is a design studio that is based on individual work. In these kinds of studios:

- tutor- student interrelation: happens in four different ways. First is the unit master system, that is based on the tutor being the only one in the design studio. The second one is pool system. In this system, students as individuals, travel different tutors and get critics from each of them seperately. In the third system, the tutors exchange their group of students from time to time. In the final system, the tutors form a group and give critics all together to the individuals.

- student- student interrelation: happens with personal endeavours. Polarization becomes unavoidable, however, in a design studio environment, learning should occur in between equals through reciprocal dialogues.

- student- computer interrelation: computer is used only in project development and presentation levels of the design process.

Collaboration based design studio structures, is a design studio that is based on teamwork and research. Diagrammatic design becomes the tool for such design environments. In these kinds of studios:

- tutor- student interrelation: at the beginning phases of the design, all the teams work with the tutor team, within time when the project starts to become more detailed, each team chooses one of the tutors that shows interest to the research agenda of the team. There is not a hierarchical structure, which allows productive discussions to occur.

- student-student interrelation: similar to the tutor-student interrelation, here there is not a hierarchy. The dialogue inbetween the team, is crutial for the succes of the project. Student-student interrelation can be described in three major points. These are: uniformity, students having the same goal in the design of the project, duty share; students working on the design roles of their interest and skills and communication medium, the medium that the students create while desigining, the language that they speak and diagrammatic processes as a tool for design.

- team-team interrelation: there is an intense competition between the teams. Transfers of students inbetween teams is done accoring to their knowledge and talents. Cheating is allowed in this kind of design environments.

- tutor-tutor interrelation: the tutors form the research agenda and tutor the studio altogether.

- student-computer interrelation: computer is used in all the levels of design. Transforming itself to a team member.

After being described through the interrelations of their members, these two postgraduate education structures are dealt with comparisons through their mediums, the design products and the processes. In the conclusion / discussions section, supported by the questionnaire, the positive and the negative contributions of collaboration based design studio structures to the design process are examined. The necessity of these studio structures that use diagrammatic design process as a tool for research based design in today's requirements are put forward.

1. INTRODUCTION

In this historical turn of the century, together with the computer revolution in the information age, the aim of this thesis is to clarify, grasp and understand the new tendencies that might reflect the changes and their impact on the education medium of the architectural world.

Beginning with the new technologic developments, the expectations of people in relation to their living environment have changed drastically. The current pattern of life is more fluid, dynamic and faster. Spaces require having the capacity to transform to one another for the needs of various crowd behaviours, as their movements connect the fragments in space in constantly changing configurations. The design of spaces based on transformations; require highly skilled professionals that can simulate real life in their projects. The edge conditions of spaces become more blurry and they are more morphed to one another. Shannon (2003) relates this to one of the six points for architecture of 21st Century. Boundaries of city, strip, suburb and cultivated nature are no longer clear-cut. New processes and terminologies should be borrowed from other fields. It should be accepted that the modern way of design is no longer the answer to the needs of this era. There is a need for diversity in design and new architectural formations, other than the highly consumed typologies of modernity.

The influences of this change can also be observed on the material world as well. The ease of application and maintainability are the key requirements for the ideal materials of our time. Of course, with such developments, the profession is divided into segments of disciplines for better management of these aspects. Architects no longer work on their own, but in teams with interdisciplinary teams. Architectural offices begin employing different professionals that have various expertises.

The architect who is defined as an individual and heroic character is now rapidly leaving this image to corporate offices with collaborating designers having weird alphabetic names. Anonymity of individuals is becoming the fame of the collaborations. There are no superstar individual architects anymore. For Caudill (1971);

> ''The day of the prima donna approach to designing buildings has passed. The new way is by team''

The ones that still survived from the recent past have already changed their names into abbreviations such as SOM, RRP, ZHO, etc...

Today's professional world and the educational world are in a way detached from one another. The existing limits of architectural practice are already corroded and the united disciplinary structure is already demolished, the design process is resolved within different fields of action. While this separation is continuing in the real world, the combined structure of knowledge still survived in the educational world. As important as the survival of the combined structure of knowledge in the educational world, the design studios still protect these interrelations and even though there is segmentation or proficiency, they obtain the blending ability to design, in the foundation of the profession. For this reason, the natural capacity of design formation of an architect and the studios that construct architects are gaining importance progressively in every aspect of the discussions.

Comparing the architectural education in the world with the situation in Turkey, it is seen that the architectural students are under the pressure of completing their undergraduate education within the shortest possible time and seek employment. The architectural education in Turkey is 4 years. All over the world, the first year starts with the teaching of the basic design principles, later on focusing on the various aspects of the professional education. As one might expect, the four years of education is not always sufficient for a proper undergraduate education. As the process of globalization continues, the aim is to homogenize an accredited and a high quality education all over the world. Exchange programs like ERASMUS, SOCRATES or special agreements between the institutions require a medium where the free movement of students, tutors and the flexibility of the education and

adaptive professional programs contribute to this development. All these expectations of globalization force architectural education to have a common ground in different educational institutions especially in the undergraduate level. The general aim is to have undergraduate program as a general design education and later on focusing on the professional education in the postgraduate level. Looking at the issue with this perspective, variety of postgraduate programs will eventually be evolved based on studio structures for the professional education.

Some of the problems of the current undergraduate architectural education could be defined as the split between the research and the practice, the lack of research in design studios, the lack of preparation for the life-long learning and the fake over confidence of the graduate. Currently, postgraduate education is classified into two categories all over the world. One is only research based with a degree on MSc. or MA. and the other is design based with a degree of MArch. Some institutions are now starting to change this structure by inserting intermediate postgraduate programmes that involve research as a basis for design. The aim of a design based postgraduate education should be to cover the missing points of the undergraduate education and to prepare the architect for the professional life. Having these demands in mind, full-time design based postgraduate studios should evolve to cultivate a mature professional education.

In some postgraduate architectural design studios, the structure of individuality is changing to team based structures. It is a way of preparing the students to this rapidly changing world, as well as teaching them how to analyse, do research and design for the new era. The education of the architects that will create our civilisation's image is the prospect of our future. So the debates on the education of an architect become more and more relevant for the future developments and the survival of the profession.

Following the current debates on the profession itself, this thesis introduces and explores the recent approaches in postgraduate architectural studios. In this thesis, the author wishes to share her personal experience both as a graduate from the AA MArch programme during the period 2001-03 and as being one of the tutors in ITU Architectural Design MArch programme from October 2004 to January 2005. The

author witnessed that the prior position of the students within the design studio environment differs depending on the structure of the design studio, which culminates in effecting all the process of design within the design studio environment. Architectural Association Design Research Laboratory is a MArch Degree Programme in London with min. 20- max. 50 students. It is a fulltime program, based on design and research. The structure of the programme is based on the collaborative work. Each MArch takes 1.5 years, with the research agendas having 3-year periods hence allowing collaboration to occur between the different levels of the agenda. ITU MArch Programme is a 2-years design programme, based on individual work. Looking at these examples, postgraduate design studios can be classified as ''individual based'' and ''collaboration based'' design studio structures.

This thesis aims to prepare a database for postgraduate education, as well as stating the issues related to collaborative work in the formation of an architect. In order to understand the formation of an architect in our era, one should follow the current debates that take place in the professional field. In the first chapter by looking briefly at these current debates on: the profession, the product of architecture and the architectural education, the needs of our era are presented. Since architectural education is highly complex, it is important to state its contextual basis. For that reason, in relation to second chapter, design studios are explained as the dominant factors in the education of an architect and the design activity that occurs within is explained in the sections; design ideas, representations, evaluations and development. Subsequently, another important component of design education is the members of a design studio. The definitions of these components are relevant for us to understand the design studio medium; therefore, they were defined as part of the second chapter. The interrelations of context and contents as members, explain us a medium in a clear manner. The postgraduate studios classified as ''individual'' and ''collaboration'' based are explained in the final chapter by focusing on the interrelations of their members and later on compared to one another with the purpose of finding out their differences.

In order to find out and explore more the effectiveness and the use of collaboration based design studio environments a questionnaire was prepared for AADRL class of 2001-03 and 2002-2004. The questions aimed to support the research exposed in the

final chapter, presenting the roles, the subdivision of tasks, the efficiency and the difficulties of the process as well as the product, the benefits of the medium and concluding with the interrelations of the members. There were forty inquiries in total and only seventeen of them answered the questions. The questions were asked by e-mail, so none of the inquiries had the chance to know each other's answers. Through the replies of these questions, the important milestones and the difficulties of collaboration-based design studios are addressed. The questionnaire is placed as an attachment to the thesis, allowing each question to be examined with its replies, through which comparisons can be made. The replies of the questions supports the discussions in the conclusions section emphasizing on collaborative design studios as being a research based and diagrammatic design environments.

2. THE CURRENT DEBATES IN THE DESIGN WORLD

The history of architecture started sometime in 8000 BC, when the human beings transformed their way of life, based on hunting and food gathering to life based upon the systematic production of food. This shift in the way of living created small teams of settlements for safe and productive agricultural living. The agricultural revolution was a very slow process that took about 9700 years, until the industrial revolution, that took place in 18 century. With the invention of steam machine and electricity, a power economy developed. The usage of new tools and machines, such as cars, trains, etc.. resulted in the cities becoming larger and more complex. The use of new materials was possible and needed well-organized documentations for constructions. The architect's role became more defined and differentiated from engineers and constructors, until the computer revolution, which happened after Second World War. The computer revolution spread out much faster and within 30 years of time, the society no longer had just an agricultural economy and a power economy but also an increasingly important information economy. The complexity and the organization of multiplicity of information resulting from the computer revolution caused the professions to split within themselves in order to deal with the amount of diverse information that is being produced. Being an architect was not enough to manage so many different diversities, and expertise on sublevels of the profession become inevitable. Nowadays in the world of architecture, new discussions arise on the formation, evaluation and content of the profession and its education as we start to see the influence of this new era.

2.1. The current debates on the profession

Starting from the last ten years of 20 century and accelerating every passing day, the transformations of technology and politics corroded our values and concepts that guide our movements and our understanding of the community. Accordingly, in order to understand and transform the world as architects, the need for developing

new models, and to shape the new principles of ethics are an obligation. For Gomez-Moriana (2003), the following actions must be taken immediately (Table 2.1).

less	more
academicism	research
competition	cooperation
hype	substance
glamour	intelligence
opulence	affordability
heroics	modesty
hero worship	critique
pretension	triviality
seriousness	humor
elite	pop
arrogance	empathy
branding	ad-busting
Wall Street	Canal Street
objects	networks
workaholics	personnel
virtuality	reality
ideology	ideals
visuality	feeling
rationalism	empiricism
signature	vernacular
solos	jamming
bla bla bla...	ha ha ha!
output	input
skyscrapers	housing
aloof	down-to-earth
®	@
talk	action
loudness	silence
either / or	and / or
Bush	Lula
Hollywood	Dogma
ARCHITECTURE!	architecture?
less is more	more or less

Table 2.1 The immediate actions that should be taken for transforming architecture, (Hunch, 2003: 221)

The architects can no longer be just responsible for a design of an edifice but they should see the potential of the profession and should be able to abandon the understanding of our classical job description and the view of our trade union. They have to challenge the existing conditions that are proposed to them in order to take architecture to a higher level; to a level of recognition that it deserves.

In this concept, they should question the sufficiency of the existing representation models and design ethics. They should be concerned with the practice of contemporary techniques into their designs. In the AD magazine guest-edited by Ali Rahim (2000), this interface between architecture and present-day culture is defined as 'a complex feedback loop', meaning that contemporary techniques produce new effects which act on or influence an object, affecting human behaviour and technical performance. By doing so, they transform culture through replication and produce new and different effects- new techniques, which result in an unimaginative array of design products. It becomes a responsive design process, which allows architects to take a critical position on defining the course of action, using the requisite tools.

According to Roemer van Toorn (2003), the explosive and rapid change of our era that is starting to shape up our design approach is outdating the old political, technical, and social lexicon of space. As he states, on one hand our civilization - through further deregulation, migration, individualization, corporate globalization, imperialism, expansion of technology and media, environmental abuse, and economic warfare - is collapsing. At the same, new frontiers are emerging in the aftermath of 9/11, which demand that architecture revise its material practice, its political stance, and its approach to education, (Illustration 2.1).

Illustration 2.1 The attack to twin towers in 9/11

This thesis explores one of the ways that approaches the design education, with the intentions of having these demands on design ethics and responsibilities of architecture. The aim is to address on the prospects of the current changes in the architectural education and practice with the use of contemporary design tools and theory, by showing it through experience.

2.1.1. The role of the architect

Defined in the dictionary of Dogan Hasol (2002), an architect is a man of arts and science that designs, draws and guides the application process of buildings. The status 'architect' was defined even in the times of ancient Greek and roman times. Vitruvius, the Roman architect and engineer has clearly defined the duties of an architect in his books on architecture. Today an architect should have the knowledge on structure, heating systems, air conditioning, lighting, infrastructure, structure physics, etc..The buildings are becoming more complex, forcing the architects to cooperate with all these proficiencies. In the realization of a building, the architect is in the leadership position in this technical, aesthetics and functional cooperation of a team(Hasol, 2002). It is seen that the collaborative work arise even in the description of architect as a word.

Vitruvius when describing the profession ''architecture'' in his first book, chapter one, addressed that the science of the architect depends upon many disciplines and various apprenticeship which are carried out in other arts. According to Vitruvius, an architect's work consists of artisanship and technology. Artisanship is continued through familiar practice, which is carried out by the tools in such material as is necessary for the purpose of a design. Technology sets forth and explains things shaped in accordance with technical skill and method (Granger, 1995). Not many things have changed today in the profession of architecture, meaning as the science of architecture, especially in architectural offices that tend to work in interdisciplinary teams in accomplishing their works. With the use of computer technology in their designs, they have the software to sculpt in virtual environment and then cad-cam tools or 3D printers to materialize them. Therefore, the definition of an architect remains the same through out the years of different eras.

Architecture has always been one of the oldest and most influential professions for societies. However recently there is an entire new and active role for architects, as computer revolution brought architecture to the public level. For hundred of years, drawings intermediate and represent objects between the conception of an executed project. These methodologies have proven to be the main and most reliable product of designers. Usually the drawings were as valuable as the design, like a delicate art piece. However today, with the consuming boost for design, the project database became the essential valuable product, and drawings were reduced to inexpensive, disposable, automatically generated representations. More often, clients and contractors started to demand delivery not just of these reports, but a copy of the database itself. The architect is not just paid for the design but also for all the information that is created during the design process.

As a consequent of this fundamental reform, labour specialization and new design roles gradually emerged. The profession has subdivided itself, to keep the same level of efficiency in an increasingly more complex amount of work. The architect is presently an enterprise, meaning the ''atelier'' is now a specialized office, containing an array of related activities. Mitchell & McCullough (1995) addresses some of these roles in an office as; library database specialists (develop elements and details), project specialists (make design decisions in relation to databases), analysts (operate on developed project database), production specialists (with graphic design skills), database managers (responsible for security of the database) and project managers (maintaining consistency in the database, appropriately organizing, reporting and updating). They are all proven by the frequent converted denominations ''Architect X'' to ''Xarchitect(s)'', (Illustration 2.2).

> ''This redefinition of skills and roles is likely to be of comparable long-term significance to that which took place in the Italian Renaissance, when the role of the architect who drew separated from the role of a craftsman who built.'' (Mitchell & McCullough, 1995: 382)

Illustration 2.2 The UN Studio architectural office

The role of 'the architect' in public is being discussed in all manners, as the architects are now having difficulties in defining their duties in this separation of the profession. Their role is changing from the designer guiding the community to designer guided by the community. The community demands and wishes, and architect do not have any other option but to respond to these demands in order to survive (Illustration 2.3). Having observed this change in demand business is realizing that public like artistic architecture with a stimulating narrative.

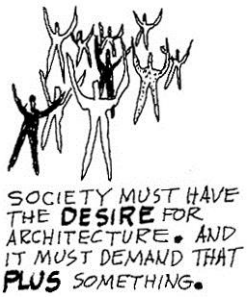


Illustration 2.3 Society's desire for architecture (Caudill, 1971: 59).

With the careless integration of 'wallpaper-architecture'; as it is so cliché that it becomes part of a fashion-architecture magazine that can be found in every café, dentist, waiting room, etc.,. in our culture, the question as to the architect's displacement in society becomes more ambiguous as well as evident (Illustration 2.4).

Majority of the projects seem to pacify rather than define any ideological position; design promotes the industry, in a pseudo-cultural mode, rather than challenging the stagnation of late capitalism. Architects become common salesperson that provides

standard projects, like those of wooden prefabricated houses. The avant-garde's ambition of uniting arts with life has become reality, where as provoking the inverted and negative effect of 'après-garde' meaning producing what has already been done and preventing evolutionary design.

Illustration 2.4 Wallpaper architecture

What's more, designers now have to be very precise, when dealing with many different national eccentricities, languages, and protocols because society decides the course. Many architects start to do work in different areas of the globe, dealing with diverse cultures, expectations and necessities. None of the projects resembles one and other and each project comes up within its own complex circumstances. Compared to the past the demand of the public is not necessarily intensified, but challenges the architects more. If designers stay detached of their defined rules, they are likely to be consumed in this systemised global process. As Wiel Arets (2003) the preceding dean of the Berlage Institute, addresses the problem in a dialogue between Roemer van Toorn as:

> ''The discipline is becoming more and more complex. When you design a new building, you have to do research, you have to develop your own ideas, and you have to develop your concept, be part of larger debates, find out about what is going on in the world, and design a budget. Then, at the very end, together with your client, you are responsible for execution. It is difficult to make interesting work.'' (Hunch, 2003: 28).

Because of all these changes, today's architectural point of view is also starting to shift. This would surely affect the future, by means of change of mentality in the

understanding of the profession. Meaning that the power of architecture is more apparent with the wide spread of design issues to public level. Allen (2003:64) describes Kipnis' opinion as:

> ''Jeff Kipnis observes, in late 1980's, that ambitious architects tend to think of architecture as a defective form of another discipline, etc ...architecture as defective physics, as defective politics ..However the practise of architecture involves a very particular mix of knowledge and skills. We are not any longer looking for the answer of what architecture is. What it means? Rather what it can do? It is a big shift from meaning to performance. The consequence of this shift is the focus to pragmatic questions of effectiveness, strategy, and implementation.''

The architects that will achieve to change their point of view will gain back the role of the architect in the community and the strength of architecture. Architecture has the power to create new spatial configurations and explore new potentials of design, which would culminate in humans to adapt to the changes of the world, evolving their ways of living. At the time of postmodernism, Jameson also pointed out this power of architecture in his essay 'The cultural logic of late capitalism'. For him, we have to possess the perceptual equipment to match to the new hyperspace, as Jameson calls it, in part because our perceptual habits as humans are formed in that older kind of space, he has called the space of high modernism. The newer architecture therefore stands as something like an imperative to grow new organs, to expand our sensorium and our body to some, yet unimaginative, perhaps ultimately impossible, dimensions (Leach, 1997). If architects start to create evolutionary architecture other than producing what has already been done, architecture will receive back its level of recognition that it deserves and evolve our ways of living.

In the example of Frank Gehry's Bilbao Guggenheim Museum (Illustration 2.5), we can see the positive impact of architecture to its surrounding. Before the museum building, Bilbao was just an industrial city, without any interesting sightseeing areas for tourism. After the building was constructed, the city became a very important cultural centre in Spain, attracting many tourists. It became richer. As Bilbao is a Basque region, there were many problems of terrorism and poverty, however with the development of the city, these problems started to be solved.

Illustration 2.5 Guggenheim Bilbao Museum

2.1.2. The future of the profession

As industrial revolution brought architecture to the public level, digital revolution might take architecture to a sub level. The introduction of computers in design had an immense effect within the design process. Moreover, the profession itself, these effects had an extent to the public, resulting in an almost imperceptible gap between evolutionary design and pseudo-design.

The future of the profession is uncertain, since some software; computer programmes, allow de-skilled people to design, such as the lost of artisan in the industrial revolution. Now, individuals and small teams with very limited resources can use existing design software to carry out major tasks that would have been far beyond their capacities in the past. A good example of such could be the scripted software that redesigns a space according to the parameters that you apply to existing modules of the system (Illustration 2.6). Common people would do design tasks with general layouts, font choosing etc …even in their daily routine. As for Mitchell & McCullough (1995) though we may regret the passing of some familiar crafts, we will find that new crafts arise to take their place.

We could defend the traditional way of design; however, it would be lost-bet against history. If we care about architecture, cities and the landscape, we should try to find more ways of exploring design and extend our creative imaginations. Architects that have the chance to explore new ways of design and research will be able to adapt interdisciplinary techniques to their designs. For Migayrou (2001: 6);

> ‘‘The architecture that is now happening is plural, pluralist, multifaceted; it intermingles discourses, practices and techniques. It is efficient and it embraces the industrial world like an inexhaustible register of materials and procedures, from which it is necessary to draw in order to regenerate our relationships with the limitless urban sphere that looms ahead.’’

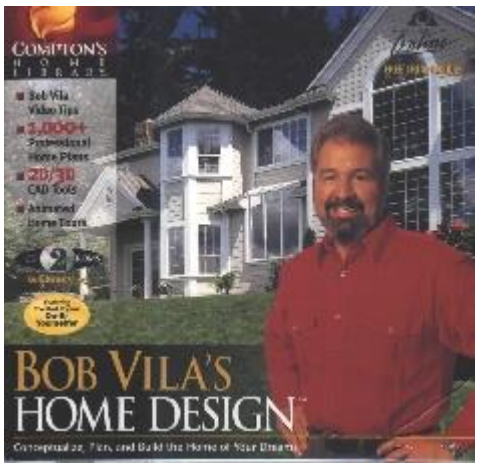


Illustration 2.6 Software design your home

These techniques could be borrowed from different proficiencies, such as car building or ship building industry, industrial product design tools, and many other interdisciplinary fields. This will allow architects to design and create unique projects that would elucidate the evolution of architecture. Mitchell & McCullough (1995:8) express their thoughts as such:

> ‘‘In order to create something new we should understand the means and conditions of our era, the computer revolution. We must try to discover where various kinds of software can take us.’’

One of the most famous offices that explore the possibilities of current design and manufacturing tools is GLForm. The office is structured around the belief that a combination of specialized expertise and collaboration rather than singular vision is the most appropriate creative mode for the future. This approach has allowed the office to work in collaborative partnerships with a variety of architects, graphic, fashion and industrial designers, urban planners and artists on a range of international projects.

In their housing project ‘‘Embryological Houses’’, they have explored the possibilities of car manufacturing tools. The houses were planned according to the expectations of

the users, and the users have the chance to choose the activities they would like to perform in their houses. The houses are composed of 540 pieces in variable sections. A change in one section, effects the whole configuration of the house. In order to achieve this, they have used the computer through out their design process and then used cad cam techniques and CNC machining to visualize their final products. The bases of the moulds of the houses were carved to the polystyrene material, creating the shape of each section. Later on, these sections were used to create the moulds of the structure of the houses (Illustration 2.7).

Illustration 2.7 GLForm ''Embryological Houses'' manufacturing technique, CNC machining.

Of course, while using these tools, architects start to address new meanings to their designs. The traditional ways of design becomes no longer valid in communicating with the uses of technology. Therefore, design starts to be based on concrete data and information, instead of likes and dislikes of the one. The design process becomes more valid as it is the main concept that forms the design product. Benjamin (1998) addresses this view by saying:

> ''In regard to practice it is not just the specific use made of technological innovations that is fundamental. It is rather that technology has provided the models in terms of which these innovations are to be understood, and, just as significantly, the computer has become a device that is inseparable from the design process itself.''

2.1.3. The architectural office environment

The architectural office environment is also changing in relation to the tools that we are using in design. For Mitchell & McCullough (1995: 351);

> ''The studio environment of the 21. Century can be described as the network of information formations, where everything is converted from physical to virtual. Such as computer files replace drawing file chests, display screens replace drawing boards, software tools replace parallel bars and triangles, electronic communication links and laser printers replace backline

print machines and mailing tubes, task controllers replace punch lists and bar chart project schedules, and teleconferencing replaces the conference room''

Many design firms started to locate the mass of their activities in areas where rents and labour costs are low and communicate electronically with small offices located for better convenient access to clients and sites. Big firms like SOM, has several branches all over to world, depending on their need to settle in project areas. They prefer to work with different people from all over the world with variety of nationalities, in order to enrich the possibilities to do work in many countries. With the new regulations of for example European Union, professional architects find it easier to travel in between countries. This brings in the issues related to accreditation, free movement of architectural labour and standardization of the profession in the global market. Many times, these big firms get into collaborations with smaller local firms to solve these issues; in the example of China, the political situations force them to do so.

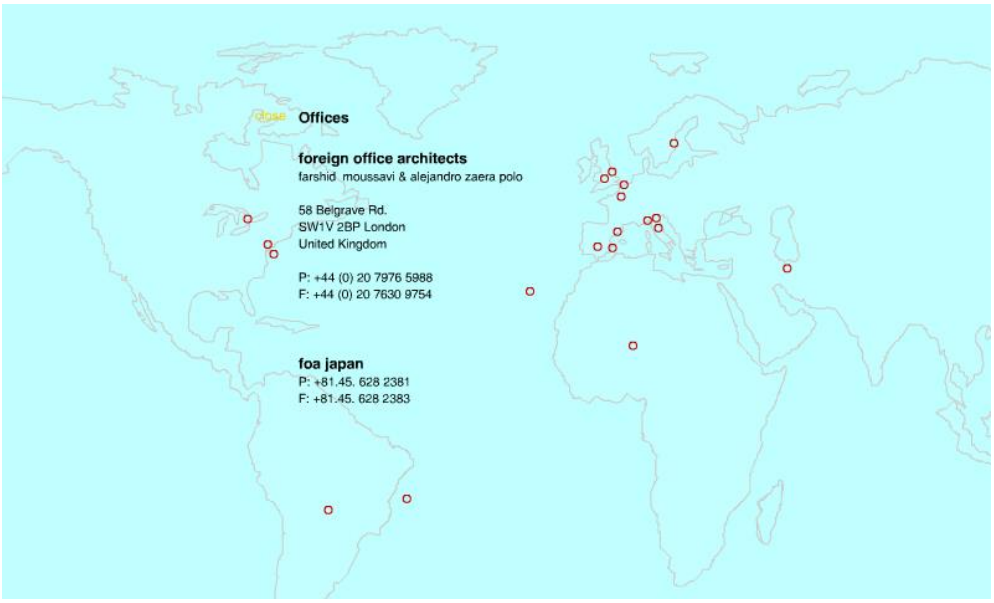


Illustration 2.8 FOA: An example of twenty-four-hour operational offices

Other advantages of these firms being multinational is related to their geographic distribution and timing of their design work. Mitchell & McCullough (1995) has named these types of offices as twenty-four-hour operational offices, 'Tokyo-Chicago- London - Tokyo' (Illustration 2.8). These offices work in one part of the world and then transfer the files through the web to a Western office branch to gain

time as the Western office branch continues working through the time when the Eastern branch is closed. Therefore, the office works as a twenty-four-hour operational office, gaining time for more efficient production.

2.2. The current debates in relation to the product of architecture

The product of architecture is the designed spaces that we occupy. With the changes of architectural space in relation to the expectations of our time, the architects that design it, need different design methods, as the already defined methods and typologies of architecture is becoming insufficient. The evolutions in the information technologies and materials are causing complexity in designs and the spatial expectations of the new world require highly detailed and advanced work of various disciplines. It is our duty as architects to investigate on how and what to do for the generation of not yet known spatiality and social organizations. The cosmos is linked to one and another in a rhizomatic manner where the change of one effecting the other. Architecture is a highly complex profession that has to deal with all these variables of the cosmos.

2.2.1. The spatial language of our time

The space that we live in our time is the city itself and according to Arets (2003) the spatial language of our time; our contemporary civilization is based on imperfect systems, on uncertainties, and thus more adaptable and flexible then ever before. All the trials designed by architects on creating the perfect living, starting with the Greek cities, continuing with Le Corbusier's Paris in the book 'Towards a New Architecture', were all uncertain formations in the beginning. However, they allowed us, human beings more to adapt and to interpret comparing to vernacular or organic formations by means of attaching, becoming part of or camouflaging to the city.

There is always change in time, which now happens faster comparing to past. Every city has its own logic for the development within its time. With the expectation that by 2010 about 80% of the population of the world will be living in the cities, the challenge to make the city a desirable place must be taken on. Architects that surpass from the crowd of mass constructors would gain the privilege to create important

milestones of architecture within this transformation of the cities. Arets (2003: 70) explains his ideas on the city as:

> ''The city should be radically transformed through ''difference'' rather than ''sameness''. The need for borders becomes clearer as the distinction between landscape and city becomes blurred.''

As observed in FOA's, Yokohama Terminal Building, evolutionary architects already started to explore these notions in their projects. Yokohama Terminal Building designed unique for its location, creates an urban lobby for the city. It attaches to it as an extension, but also distinguishes itself with the formations of its complex interior programs (Illustration 2.9).

Illustration 2.9 FOA Yokohama Terminal Building

Geuze from West 8 architects explain his ideas on traditional space as,

> ''Speed and time have replaced the traditional idea of space, where everything is pre-programmed, creating one-dimensional space''. (Jormakka, 2002: 17)

Geuze proposes, the architectural space of our time should respond to the movement of people, preventing demoting human beings to mechanical road users. The spatial language of our time becomes more fluid and responsive, when such applications exist.

Principles of how movement unfolds architectural experience are exploited in full in the bibliotechique Jussieu project by Rem Koolhaas and OMA (Paris, 1993). The library is considered as a vertical, intensified landscape in which campus net work of

streets and paves culminate. Instead of separating the floor levels in the large block, the levels are folded to form a continuous path. Large sections of the floors are not horizontal but warped in order to provide access and visual connections between levels. As a result, the path forms an architectural promenade with an incessantly transforming section (Jormakka, 2002).

The program of the building changes continuously, without affecting the general architectural character of the building. Forming a peaceful background in the building against which life unfolds in the foreground. The formal solution generates activity by architectural means, as the tilted planes provoke the visitor to keep moving (Jormakka, 2002).

Another project based on movement, is the Möbius House by the UN Studio (Illustration 2.10). The house is organized as in the concept of Möbius Strip; a surface resulted from a mathematical formula. The program for the house is conceived as a twenty-four-hour cycle of living, working and sleeping. Spatially the house is organized as two intertwining paths that trace how two people can live together, yet apart, meeting at points of shared spaces. The idea of two entities running their own trajectories but sharing certain moments, possibly also reversing roles at certain points, is extended to include the materialization of the building and its construction. The Möbius diagram dictated the choice of materials and the circulation, making the building into a Corbusian promenade rose to a higher power. In a Möbius Strip, the inside becomes outside and vice versa, so facades of the house become inner walls and glass and concrete swap places with every change in direction, the structure oscillates between dialectical pairs that move past each other, inside to outside, work to leisure, and load-bearing to non-load-bearing structure. The views of the interior and the exterior result as a fluid synthesis of movement in architecture (Jormakka, 2002).

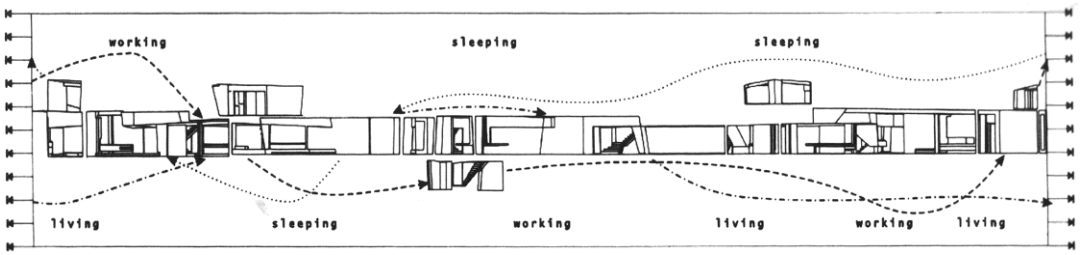


Illustration 2.10 The Möbius House by UNstudio, Godwin (2000:77).

2.2.2. The role of the product of architectural practice

Designers are reached to a level of cheap service providing strategy, at which an average designer may have to lower the price sell of his ideas to be part of the market, as it is better being cheap than not being at all. With the use of the www the information that is produced now, reaches to more people than ever, so there is always an audience that would appreciate the work that is being done. 'Consumption' is the word to define the aspects of our time. Likes and dislikes come and go very fast and everything is consumed within very short periods of time. In order to be successful and different, the designers have to be very bright, inventive and open for the new tools of this era. The faster you create information, the better you take place in the arena. As Roemer van Toorn (2003:10) explains:

> ''The public demand for newness, excitement, monumentality, ''culture'', pleasure, safety, memory, and other cosmopolitan trends has created a new kind of arms race with design as the crucial weapon. As the number of architects rise, politicians and developers are feeling the pressure of an increasingly sophisticated audience that craves top-quality design in the public realm of cities.''

The design process of the product of architecture is starting to have a more important role in our lives. As it is very difficult to create a design without resemblances, the ways of realization the design becomes more precious. The design process is based on information, in a way to prove the uniqueness of designs. Emergent design techniques evolve with the discovery of new design materials as well as production methods (Illustration 2.11). By learning these processes architects start to do their designs in a more efficient manner. These methods become part of their design process and guide it through their evolution.

Illustration 2.11 Future systems Birmingham Selfridges Building

To produce a relevant amount of information for designs, the products of the evolutionary architectural offices are created by a number of people. For Broadbent (1973: 358), teamwork is in the nature of architectural design:

> ''In the nature of architectural design, it is not possible for any architect to wield power without the full collaboration of others …The architect inevitably works as a member of a team; however strong his personality, he still needs a great many other people- architects, technicians, consultants, contractors, and so on-to translate his ideas into reality.''

The teamwork and the interdisciplinary work are united around the design object. The discussions arise from and over them. The architects are becoming to be less important than the object itself and the quality and the unity of the design product becomes more important (Illustration 2.12).

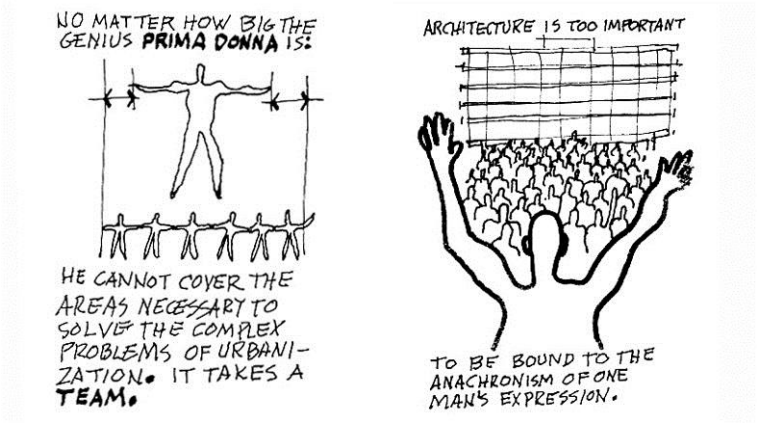


Illustration 2.12 The complexities of the project requires a team for designs (Caudill, 1971).

2.3. The current debates in relation to architectural education

The unsatisfactory existence and the problems of today's architectural medium are related to the architectural education. The current debates in relation to architectural education, mainly focuses on the split between the research and practice in architecture. The split can largely be attributed to the problems associated with educating professionals in a university or academic setting. Although architecture has been a part of the university system for over a hundred years, many practitioners today are arguing that university control has led to a debasement of the architectural profession. This mindset is precisely broadening the gap between research and practice. In the late nineteenth century, architecture was brought into the university setting to accomplish several goals: upgrade the social rank and intellectual eminence of architects and to democratize access to the profession. It was hoped that by establishing an educational system similar to that of law and medicine, architecture would achieve a comparable status and pay scale. As a result professional competence and quality control in education started. RIBA was the first to be founded in Britain in 1837, in order to promote architecture and architects. All around the world, the institutions started to control the education of the practitioners after that.

Early on, it seemed as if all this was accomplished. Architects were seen as members of a discrete profession with the ability to remain distant and separated from the rest of academia. However, gradually, we, as architects, began to learn that architecture alone could not cure the ills of society. Collaboration with other fields and disciplines became as a necessary and vital part of architecture in the 1960s, the same decade that saw the advent of doctoral programs in architecture. While researchers or research-based architectural offices often recognize the need for collaboration, practitioners often sit alone in an ivory tower and avoid the changes necessary to welcome this integration. Architecture programs are caught in the middle of the academia, which attempts to foster multidisciplinary activities, and the profession, which fights to retain its autonomy in the visage of a society, which sees the architect as an expendable part of the building process.

2.3.1. Profession's identity

The distinction even exists within architectural academia between the practitioner/tutor and the researcher/tutor. Practice-oriented tutors are educationally unprepared or intellectually disinclined to do scholarly work compared to their colleagues in other disciplines. Tutoring in the all-too-exalted design studio, these tutors exert a tremendous amount of influence over their students and often encourage the future architects to turn their backs on research. The future of our profession lies on the resolution of the separation problem of the discipline into two segments (Illustration 2.13). According to Uluoglu & Uraz, the profession is divided into two: a professional practice and the educational practice.

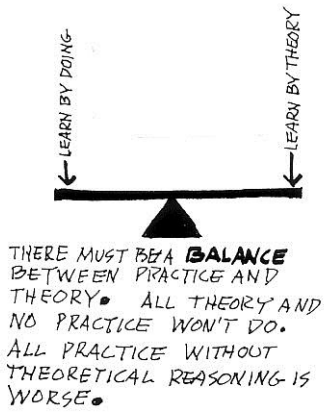


Illustration 2.13 Balance between theory and practice, (Caudill, 1971: 162).

The dichotomy of research and practice seems to have provided our educational system mute, unable to voice direction and worse yet, not even seeing the need to do so. The lack of focus in our own discipline has created several crippling obstacles. Schools of architecture continue to be perceived by the humanities as 'professional programs' which train practitioners incapable of understanding the more philosophical and epistemological concerns of the academic world. On the other end of the spectrum, scientists often view architects as 'artists', unaware of the complexities of the scientific world and, as a result, unable to conduct true 'research'. Kunze (1987: 37) differentiates architectural design from other disciplines as the need for dissolving the knowledge from many fields in the same basket. Architectural design problems are currently seen as being of an intuitive nature and

requiring an integrative rather than analytical process. Ayiran (1995:55) explains the view of other disciplines as:

> ''Generally the design studio tutoring process is misunderstood by academics from other disciplines as they see it as a mysterious process. Here, it is difficult to obtain a uniform teaching and a research situation that traditional science disciplines like mathematics, physics, etc ...have achieved since centuries. The aim and the effectiveness subject are not clear in design studios which reflect the complexity of its tutoring.''

Scientific problems (in both the physical and social sciences) require systematic, analytical methods of investigation where the researcher is trained discursively. While the university strives in the pursuit of knowledge, along with the aim of graduating those who will continue that quest, it will ultimately lead to the creation of an educated public, which will encourage the preservation and transmission of that society's values. Simultaneously, architectural education draws from a so called 'artistic' profession and has had its dominant goal as the creation of design practitioners, by introducing students into the field of architecture, incorporating skills to appropriate a membership in that profession.

Somewhere between art and science, architecture is precariously balanced. Caught on the network between the sciences and the humanities, architecture is both either and neither, and, more often than not, it is displaced into the refugee camp of academic potential. Architects see themselves as the answer to the split between science and art the only profession truly in a position to merge the two into a harmonious relationship. They fail to realize that, as outcasts in both worlds, they can never be the catalysts for this happy union. According to Cross (1999), we as architects are starting to realize that we do not have to turn design into an imitation of science, nor do we have to treat design as mysterious, ineffable art. For Archer (1979);

> ''Design has its own distinct intellectual culture; its own designerly things to know, ways of knowing them, and ways of finding out about them'' (Cross, 1999:7)

This is actually an attempt to break away from the Western intellectual tradition, the two cultures of the Arts and Sciences. However, for Cross (1999), there is at least

one other culture, which can be regarded as 'The Culture of Design', which can be articulated in comparison with the other two.

Currently, the primary goal of an architecture program is to train practitioners. However, this idea of focusing only towards practice does not help architecture to evolve and take its prestigious position back in the fields of professions. The education system should also focus in theory and promote research, in order to make a bridge between art and science.

Admittedly, the obstacles; the communication between the practitioners and theoreticians, in education are primarily perceptual differences on the part of both architects and members of other fields. The architectural community represented as the universities and professionals can do a great deal to help eliminate these misunderstandings and work toward creating a multidisciplinary and collaborative approach to the design process. Allen (2003) suggests that we incorporate research as a mode of education as we are living in the midst of an information explosion. The architecture's special capacity to envision and organize information is becoming more and more necessary to make sense of the world. For him, architectural research; is applied research, investigation, or experimentation directed at the revision of accepted theories and the practical applications of revised theories. Steele (1999) sees our era as:

> 'In an age dominated by the production and consumption not just of space, but of information itself.'

Even with the advent of doctoral programs in architecture, a split between 'research' and 'practice' still exists. The profession is being centrally concerned with the current structure of practice in order that it may fulfil commissions to the highest standards. It has a temporal dimension in that its focus is on issues that have relevance to current practice. By the discipline of architecture, on the other hand, a collective body of knowledge that is unique to architecture and which, though it grows over time, is not delimited in time or space. The structure of knowledge within the discipline is such as to preserve the memory of, indeed to continue to study, that which is external to the range of current practice. Allen (2003) assumes that the interchange of theory and practice will enrich the connection of architecture to the

real world. He believes that this interchange could only be achieved if we could engage the world outside the academy.

This split has led to a fracturing of our field, which has resulted in a 'discipline' of architecture and a 'profession' of architecture. With such an internal split, unfortunately we cannot establish a discourse with other fields, one that is vital to the success of today's increasingly more complex architectural projects. For Allen (2003: 65);

> ''We have to incorporate research in order to find new ways of doing things, alternative materials and means of fabrication, or unexpected solutions to newly emerging design problems. It is a collaborative process based on the open exchange of ideas. For that means, we should develop a culture of collaboration; Architecture is a collaborative practice. Even in building a house, you are bound to work with the client and the builders. We have to equip students for networked practice that takes fully advantage of interdisciplinary expertise.''

Our inability as a profession to engage in a lively and active discussion with other fields has resulted in producing architects who are unprepared for the cross-disciplinary dialogue necessary in today's society, as well as for the collective disciplinary work. This lack of discourse and propose goals and strategies for creating a multidisciplinary architecture whose practitioners recognize and welcome the need to be involved in an active relationship with their colleagues in other fields (Illustration 2.14).

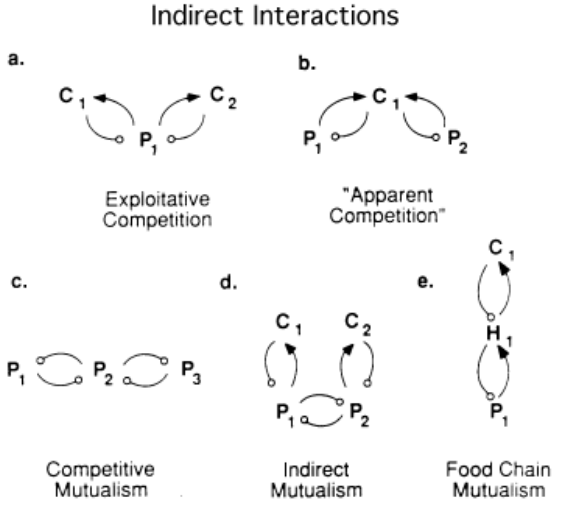


Illustration 2.14 Multidisciplinary work

Of primary importance is the image that the building creates, not how it responds to the community and how the community responds to it. To be a 'responsive agent', architects must be trained as researchers, able to conduct research in a number of related fields: technology, history, theory, socio-cultural issues of design, etc.

As we entered the twenty-first century, it is impossible for any of us to ignore that our society is growing increasingly more complex. As each year passes, the post-modern condition reveals that problems cannot easily be categorized and separated into neatly formed disciplines. Boundaries are breaking down and multiplicities of difference exist. For Cleveland;

> ''In the latter part of the twentieth century, we came to realize that most of our troubles stem from neglecting the interconnectedness of knowledge and the interdisciplinary character of all real-world problems.'' (Sutton, 1992: 66)

This does not bode well for architecture, a profession that in many ways fights to retain its position as one of the 'gentlemanly' professions. This unwillingness to change has led to an adherence to 'practice', where the burgeoning field of architectural research is commonly dismissed as being irrelevant to the advancement of the profession.

As a professional program, unsure of its role in academia, architecture has tended to resist other outside influences. Faculty in other departments often complain about how students are unprepared for the rigorous requirements of their courses. Faculty members in architecture are seen as amateurs, teaching elementary courses. Without the training in the basic methods of research in the sciences or the humanities, or even the ability to formulate a written argument clearly, architecture students are never able to enrol in anything more than introductory level courses in other departments. This only serves to perpetuate the problem that architecture professionals, as they are currently being trained, never learn how to conduct research on par with other fields.

Rather than distancing ourselves from the rest of the university, architecture programs should be making every effort to become active participants in the academic environment. The location of most schools in the centres of learning should

make accessible the knowledge, understanding, skills and judgment of other disciplines which overlap with the discipline of architecture. Students, at the outset of their architectural careers, should be made aware of the advantages of learning to work in a team setting. Their academic careers should provide students with the opportunity to discover the intricacies of other fields and learn to work together to solve the problems of the built environment. The ultimate goal of architectural education should not be to merely train practitioners, but also 'to help' students seeing the vast potential for interrelationships between ideas and disciplines. To encourage them to confront all new problems of design in terms of dialectic (as opposed to formula), to generate a spirit of cooperation and intellectual respect for other fields that will ultimately help them work in a profession that requires collective input. We should focus on producing graduates who are 'well educated' and able to apply a full body of knowledge to solve problems and adapt to new circumstances. For Schumacher, as we are living in a time of fast technological change and momentous socio-economic reformation, the confidence upon the reproduction of given architectural typologies becomes ever more questionable. Allen (2003:65) supports this idea by saying:

> ''As architects and educators we need to think creatively about new forms of expression, new spaces, new cities, and new forms of practise.''

As the half-life period of any given 'best practise' is rapidly diminishing, so is the value of an education understood as the process of teaching a given set of architectural solutions. As the demand for research increases, the value of such education decreases. This new dynamic pushes education towards research (Schumacher). This is in opposition to the 'well trained' students that is produced today, whose skills are limited to specific tasks relevant to the temporal demands of the profession. Current graduates cannot survive by knowing the practicalities of the profession, as it currently exists. Architecture is growing incredibly complex, and without the ability to evolve and contribute new knowledge to the field, new graduates have no way of surviving. Brayer (2001:11) defines this complexity by:

> ''Today, an architect's agency incorporates designers, philosophers, artists, art critics, geographers and musicologists. It explores the cognitive sciences and the media and modal territorial dimensions. The way it works it became ellipsoidal.''

2.3.2 Education system

Architectural education in its present state has drawn a wide range of criticism. Either it is under attack by practitioners for not training students in such a way that they are immediately useful in the workplace. It is also under attack by building professionals for not teaching students to understand their roles in the building process and for being unprepared to deal with construction in anything more than a cursory manner. On the academic side, it is also under pressure due to educators in other fields, for producing students without an intellectual foundation that would allow them adequate insertion into advanced courses in other disciplines. From this side, it is simultaneously under attack by teachers of building technology for placing too much emphasis on history and theory (the courses with the most direct link to the rest of the academic community). Furthermore, it is attacked by those who teach history and theory and other 'core courses', for placing too much emphasis on the design studio. Adding to this, it is under pressure by its students for being an outdated system, which lacks the ability to prepare them for an ever-changing profession.

In an educational mode the question is: How do teachers, learn to educate students in such a way that they come to understand the interdependency of all fields and are capable of working within a complex and changing profession for the betterment of the built environment? To accomplish this, we must be willing to alter our programs of architecture in ways that some may consider to be drastic. The focus of an architecture program should not be to provide students with the ability to solve task-oriented, highly specific problems. Design is not a plug-and-chug activity. There are no pre-set rules and there is no one 'right' way to design. The students must be taught to think for themselves by providing them with a rigorous intellectual foundation, which can only be achieved through good research. Pointing out that it is not need to expect or look for absolute, positive bases for environmental knowledge.

However, providing an intellectual foundation with sufficient extent requires integration with other departments and fields. Stating that architectural education should start with liberal education and with people learning not specifically architecture as a trade, but understanding the economic, political, social and cultural

context in which they exist. Kipnis (2004:7) classifies the architectural institutions into two with this mindset:

> ''At the simplest level, there are schools whose purpose is to train people in a service position. But it is important to step out of this mindset. The most challenging schools are those that teach architecture as a cultural discourse.''

Agreed by Kipnis (2004) as well, the architect should become a 'generalist', with the ability to make connections between the many facets of architecture. To accomplish this, he/she must have a broad educational background that covers a wide range of topics and disciplines. As such, programs of architecture should be created with a broad foundation in the liberal arts and sciences. Students can then bring what they learn in their general education classes and apply them to their architectural course work.

To accomplish these goals, by developing an intellectual foundation for the profession of architecture, and promoting a curriculum which has a focus on other academic fields, encouraging integration between studio courses and the core lectures and removing the existing hierarchical structure, a variety of strategies need to be examined. Entire programs must be willing to embrace a change of attitude and advocate the necessary curricular revisions to improve the ability of the students to work within the increasingly complex profession.

With critics in such a wide range of camps, we cannot continue to ignore the fact that architectural education is in desperate need of change. Architecture can no longer be taught in the same ways as the days before the Second World War. Our profession has changed, as have the teachers that educate our future practitioners (Illustration 2.15). As Allen (2003) states, we need to embrace change; in education and practice, recognizing that many of the ideas and skills we teach today will be obsolete tomorrow. According to him, there is a need to cultivate a culture of intellectual scepticism that encourages imagination, inquiry and experimentation. He sees the key survival of the profession today in research as continual learning - revising, reworking, and upgrading constantly.

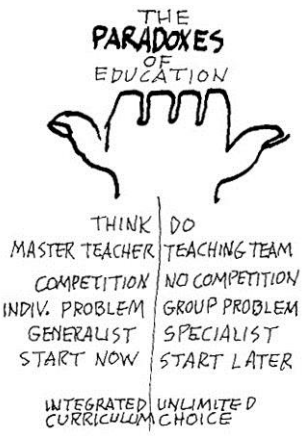


Illustration 2.15 The Changing Paradoxes of Education, (Caudill, 1971: 159).

Since the past, the architectural studios are the core of the education syllabus. Depending on the vision of the institution, it occupies the one third or the half of the syllabus; two third of the study time of a student (Moffett, 1975: 5-19). However, the way they exist today, studios can no longer stand alone as the keystone of an architectural program. Students do not use the office as the place to bring together all the information that they have gained in other courses. We cannot expect students to integrate what they have learned when we, as educators, fail to emphasize the importance of developing an integrated design process. The current emphasis in the studio is on form making. As a result, we encourage students to be unconcerned with 'mundane considerations' such as: How much does it cost? How will it affect its users? Will it stand up? How does it relate to its surroundings? What is it made of? What impact does it have on our environment? Rather than ignoring these questions, there should be a focus on creating a syllabus, which is a well-designed package of integral components each of which serve in the capacity of the others. We must adopt a model of architectural education in which the various connected issues are presented in terms of their theoretical foundations and their architectural significance in a manner that is integral to the rest of the curriculum.

The university system, of which we are all a part, has a set of values and expectations which we have been turning our backs on for over a hundred years. Under increasing pressure from the university, more and more faculties will need Ph. D's and a strong record of scholarly research and publication in the hopes of attaining tenure.

3. DESIGN EDUCATION IN ARCHITECTURE

The design education in architecture has traditionally been functioning on the model of apprenticeship. Starting with the Renaissance until the formation of the first institutionalised form of education in France with the founding of the 'Academie de l'architecture' in 1671, the practice of apprenticeship was combined with the distribution of theoretical discourse. As a result, architecture as a profession started to be taught in institutions for students that wished to become architects. At the end of the 19th Century, parallel to the scientific developments, academic teaching was adopted in England and America and is now everywhere the principal method of professional training. The academic education required and created a theoretical base for reasoning, questioning and knowledge formation of the profession. Inevitably, as architecture is a profession as much as a discursive discipline, today, the strong influence of apprenticeship as well as theory based discussions in architectural design studios can still be observed. It is accepted that a certain level of apprenticeship always exists between the tutor and the student.

Currently in architectural institutions, only the academicians make research. Some parts of the research that is relevant to architectural design studios are brought into the studios by the academician/ tutor as design knowledge, as an input for design. However, unfortunately, the research cannot be made in the design studio. This is happening for some reasons; many of which stated above in the current discussions related to architectural education. Additionally, there are some other issues related to more practical reasons; either the studio environments are not prepared for research environments with relevant tools and circumstances, or the students have other lectures or studies that do not allow continuity of the work. In most of the syllabuses, the theoretical courses are detached from the design studios. The students do not know the ways to relate the knowledge they obtain in the theoretical courses to their designs. As the students do not have the chance to practice that knowledge they

obtain in the theoretical courses, they cannot learn. This is a serious problem of the organization of an architectural school's syllabus. Many more of these problems can be count; but above all, students are not ready to understand the need to form research based design knowledge, even though it is obligatory for the upcoming years of their professional lives. In order to educate professional architects, it is a need for our time to achieve institutionalised form of research in architecture. Cousins (2004:3) also aggress to this statement by saying,

> ''There is a growing importance of what might be termed as architectural research.''

Research is crucial in an architect's life, as it feeds the innovative part of the architects. Schumacher emphasises this by leaving research to avant-garde architects and postgraduate education. For him;

> ''The task of innovation within architecture is left to the "avant-garde" segment of architectural practise on the one hand, and to post-graduate architectural education on the other hand.''

However, each of these two surrogate processes has its peculiar limitations. Schumacher explains these limitations as such;

> ''Avant-garde practise, as professional practise, is struggling to turn any particular commission into a vehicle for the investigation of new architectural principles that might be abstracted and generalised .... An academic institution is unconstraint with respect to the establishment of a coherent research agenda, but a special effort is required to steer a course that remains relevant to the concerns of society. A severe limitation for research in educational institutions resides in the short-term tenure of the student-researchers and the attendant burden of taking on a whole new generation of students/researchers every year. However, the institutions of post-professional education seem to offer the most promising opportunities to construct a systematic research practise within architecture.''

The avant-garde practise accentuates on experimental issues as the only way of innovative design while architectural institutions see postgraduate design studios as a way of professional education. In postgraduate design studios, research based design is the key for life-long learning and innovation. In order to achieve research based design, the emphasis should be on the studio environment, and the design process should be fluid, always fed by supportive courses.

To understand the architectural education in design studios, we should take a brief look at the history of architectural design studio education and then study the components of design education by focusing on the characteristics of individual-based and collaborative-based design studio structures. These studio structures are explained further in chapter 4, by stating the interrelations of their members. During the process of design, the members of a design studio start to correlate with one and other in different ways and combinations.

3.1. Design and design studios

Some of the most influential institutions in the history of architectural education that apparently functions in a design studio basis can be named as the Beaux-Arts founded in 1797 and the modern Bauhaus education, founded in 1919.

In Beaux-Arts design education, design and designer was associated with creative talent. For that reason, design could not be taught, but can only be achieved by the talented person. However, in its essence, design education was based on the application of rules like proportions, rhythm, harmony, scale, etc..that are defined from the important architectural masterpieces of the past that were not difficult to be identified at the time or else very easily understandable concepts. The relations of students with the tutors were mostly in the level of apprenticeship.

In Bauhaus education, the focal point of the design studio was the student. From the way they would cook, to the way they would design, everything was done in a Bauhausian manner (Attachment D). The school had a dormitory in the building so that the design education was a part of their daily life. The aim of the Bauhaus design was to combine art and technology for non-burjuva people, to encourage industrialization in a way that design is a part of the daily life. In the 'National Progressive Art Congress' in 1922, Gropius had announced Bauhaus as 'art and technology - the new union movement'. It started as a school of craft skills as the common basis for all plastic and design arts, which were to be revitalised in a common building project. Formal plainness, standardisation, industrial production, expression of function were the main concepts of the time. The design environment was formed by workshops, where design was triggered by applications and

technology (Illustration 3.1). For that reason, design was something that could be taught.

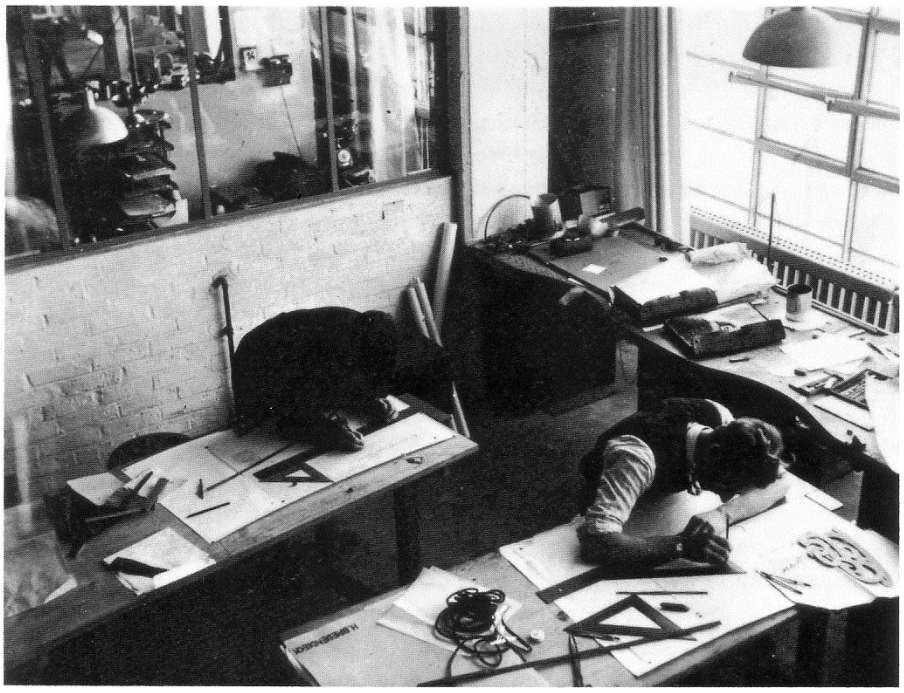


Illustration 3.1 A design studio in Bauhaus, (Droste, 1990).

According to Uluoglu (1990:38), even though their education systems differ and the emphasis that put on the role of an architect is different, some common features in both education systems can be stated. These are:

1- design education as a process of behaviour development process

2- the existence of universal truths in the self of architects or searched in nature.

The reason why the influences of both Bauhaus and Beaux-arts can be seen in today's architectural education could be associated with these common features. The way the studios operate, feeding in with supportive lectures is the influence of Beaux-Arts, as well as the relations of the tutors with their students. Furthermore, the influence of Bauhaus is especially seen in the first years of design education, where basic design principles are taught. Moreover, in later stages of architectural education, it focuses on the production side of architecture with workshops, materials and formations (Uluoglu, 1990).

There are also other institutional forms of architectural teaching in the history of architectural education, not as widely known as the Bauhaus or Beaux-Arts (Illustration 3.2). One of the important and maybe the most influential one in our times could be named as the Architectural Association School of Architecture, which was founded by the members of the architectural association that were not pleased with the education of architects of their times. It is the oldest architectural school in Britain and throughout in its history has always been an entrepreneurship. In the AA learning has been a collective effort that is observed in the unit systems structure as well as the history of its foundation. Architectural education in the AA has always been seen as something to be discovered, as something that is revealed rather than learnt. This fact has been achieved by the unit system structure, where students discovered a personal architecture rather than the mastering of a common practice since more than 30 years now. Ensuring variety of approaches, the unit system allows more choice and generates competition, as a positive element in the school environment.

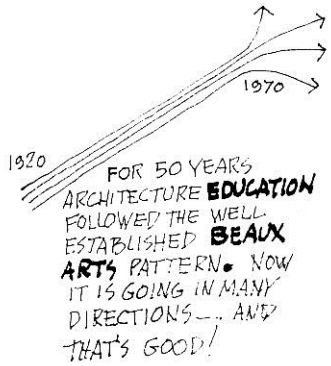


Illustration 3.2 Other institutional forms of architecture, (Caudill, 1971).

The unit system of the AA puts pressure on the tutors to create a research agenda, which promotes research to be made in design studios. However, it also has some negative aspects for our time as Steele (2004: 14) points them out as:

> ''The unit system promotes an obsession with singularity- a form of modernism that many have rejected in favour of more collaborative approaches, such as that of the DRL. The unit system might benefit from an approach that sees it as material to experiment with. The ways

> in which architects work now are so different from 30 years ago; they are more multidisciplinary and co-operative.''

It is true that architecture is a highly social profession that requires the interaction of different disciplines; like engineering, sociology, psychology, economy, politics, etc ...as well as teams of designers; like graphics, product, interior, landscape, urban, etc.... The design studio of today, should work as a design research laboratory[1] in order to investigate and find possible ways of being fully involved with design. A design studio should be seeking to re-think the discipline's role in shaping social and spatial relations. It should be able to transform the techniques and generate new modes of designs, in order to stimulate imagination by suggesting surprising use of materials, colours and reflections. Ledewitz (1985: 2) describes the primary means in design studios in three basic aspects as:

> ''Students learn and practice a number of new skills, they learn a new language and learn to 'think architecturally'. The educational experience in studio involves not only learning all three of these aspects, but learning them all at the same time. Integrating them is a large part of learning to design.''

Depending on the structure of the design studio, these aspects diverge as they take place (Table 3.1). The students learn and practice skills such as visualisation and representation. The language they learn is for expressing themselves. In addition, 'thinking architecturally' is a fundamental ability for professional performance.

	individual based design studio	**collaboration based design studio**
new skills	obtained less because of few interaction between students	obtained more because of more interaction between students
new language	drawings and talking	diagramming and virtual chatting
architectural thinking	less professional environment, difficult to achieve	more professional environment, easy to achieve

Table 3.1 Comparison of the primary means in design studios

[1] here the design research laboratory is not used in meaning to the MArch Program in the Architectural Association, called Design Research Laboratory. Instead it is used to emphasize the importance of research in design studios, creating a studio environment as in a science laboratory, supporting research.

Looking at these aspects, we see that the design activity differs from a research process in scientific field. For Rittel (1985), the design activity is not a linear process, which starts with analysis and ends with synthesis; instead, it is a problem solving process, which develops with feedbacks of pauses and transformations. Ledewitz (1985) explains the meaning of problem solving today, as not the aggregation of objectively derived facts, but a dialect between pre-conceived solutions and observed facts.

There is never a single solution for a design problem but a set of solutions that is accepted by the designer. The design activity develops generally from abstract knowledge (human sciences, such as philosophy, history, sociology, anthropology, etc..) to concrete knowledge (construction technologies, building technologies, etc..); having a tide in between during this process. The story of design activity could be explained through producing design ideas to representations to evaluations to development. Let us have a look at these points in a design studio basis.

3.1.1 Design idea, theme and concept

Design studio is a place where design information is produced and consumed. The production of design information is achieved through the transformation of collected information. As well as, through the studio medium, the production of necessary information that comes from our architectural culture and design culture, that is coming from our past experiences and personalities. The aim of design studios is to figure out the main concept behind the ideas. The ideas are formed in the beginning phases of the design, later on converted to concept, finalizing as a theme. In any level of design studio, the students should be encouraged to research and find the relevant information for finding their design theme, concept and idea.

The ways of reaching information can be taught by giving small tasks to the studio. The important thing is to show the students the ways of which's of reaching information by obtaining the right tools. In order to establish a concept for a project, the vital thing is to address the design problem, the main idea, the motive for design or to define a theme. A concept is idea based, and is a result of development of previous steps of thoughts. The aim of a design education is to teach the students how to think as a designer. They learn how to deal with design matters by asking the right questions. They actually have to be aware of the fact that design problems are

not very well defined and they are needed to be defined by asking the right questions. Apparently, the creative design process seems to start with asking the interesting questions. In most cases, it becomes the visual model functioning to visualize design. It makes it easier for the designer to imagine the peculiarities of the design proposal.

There are some difficulties for concept finding in individual based design studios. Ledewitz (1985: 3-4) specify these as;

1. discontinuity between analysis and synthesis
2. intentions confused with solutions
3. inappropriate closure
4. fear of designing

These types of problems are usually seen in analysis-synthesis model of designing and it is pretty much related to difficulties of individual based design. In many cases, the student finds himself/ herself alone during the design process. The first one is related with the formalistic way of looking at the design problems. Analysis of the problem is most of the times related with the predefined solutions or examples, where one cannot come up with variable propositions towards synthesis. Therefore, the continuity of analysis to synthesis does not work, leaving students having concepts unrelated to the analysis that they make. As the student explains these concepts verbally, it works as a visual model functioning to visualize design because of the pictorial characteristics of the words. Therefore, it becomes easier for the student to imagine the peculiar form of the design proposal. Because of this, probably design concept differs from the design theme or idea (Synder & Catanese, 1979). In the second difficulty, as the student does not have much information by means of research to begin to their designs, he sees one sketch in his hand as a proposal for the final solution. The amount of concepts or ideas that are evolved through such process can be considered as almost none. The third difficulty is related to not knowing when to finalize designing, which most of times ends up with ruining the concepts that are taken as a decision in the beginning phases of the design. Finally the last one is related to the first problem, as having nothing in his/her hands, the student does not know how to start designing as well forming a theme for his/her design (Illustration 3.3).

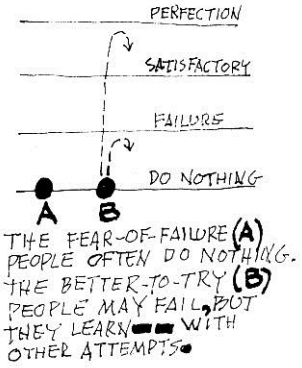


Illustration 3.3 Fear of Designing, (Caudill, 1971: 164).

Laseau (1989: 204-205) agrees to some of the problems indicated above and adds on his point of view as well as his suggestions as;

> 1. Cannot get started- sometimes working with too big problems, makes one overwhelmed. Trying to break it down into different parts helps.
>
> 2. Cannot get any good ideas- sometimes there is a sense of 'fear or failure', afraid that our solution will be judged very poor by others and that they will lose confidence in us. This requires separating one's self from the design problem. It may help to treat the problem as a challenge in a game. Or try best and use all the resources available or take a new look at the problem. If you cannot move ahead on the basis of your assumptions, then arbitrarily change them.
>
> 3. Cannot make a decision- sometimes designers cannot progress on a project because they find it difficult to come to conclusions or decide on the course of action. Choices can be facilitated by spelling out the available alternatives and then comparing them in light of a few basic criteria.
>
> 4. Cannot finish- if you find that you are filling up time or just going through the motions, it may help to go back to the original program or problem statement and ask what the basic design objectives are and what the design must achieve minimally not to be a failure.

However, in a collaboration based design studio, the process of concept formations differs. The preparation stage is consisting of a more complex research, where the information is gathered not just as analysis but also as facts that can be directly involved in design. At the 'Design Science: Method conference of the Design

Research Society', in 1980, Bruce Archer has given a general definition of research as,

> ''Research is systematic inquiry, the goal of which is knowledge.''

For architectural knowledge formation, research is an efficient method for design processes. Throughout systematic feedback into the system, designers have always the ongoing process, without major cuts. As Cross (1999) points it out, the concern of the designer in design research has to be focused on the development, articulation and communication of design knowledge. Especially in collaboration based design environments, this is crucial. The information gathered is converted directly to diagrams in order for the students to communicate with one and other, which is then culminated towards the design. The team never waits for 'inspiration' to arrive, as the design process is a scientific process that is based on facts and numerical information gathered in the preparation stage. For sharing information within the design team members, all the information has to be converted to diagrams. This process accelerates the outcome of the design proposal from an initial design idea. The crucial moment in design appears when the diagrams are being converted to the design. In the later stages of design, the work naturally divides into different segments with each person associated with it.

For Cross (1999), knowledge formation has three resources: people, processes and products, which we see as the fundamentals of collaborative work. Cross finds, designing as a natural human ability, therefore every individual feeds the knowledge formation differently. The second resource of knowledge formation is processes, meaning as the tactics and strategies of designing. The developments and application of techniques that aid the designer can be defined as the methodology of knowledge formation, which happens traditionally with sketches and drawings of proposed design solutions, or happens collaboratively as diagramming, virtual reality models and computer aided design. Finally, he defines the last resource as the product of design, as in the forms, materials and finishes that embody design attributes. One should examine the existing typologies, or design morphologies or syntax of form, in order to develop a general sense of design knowledge.

3.1.2. Representation

Representation, in two- or three dimensions, is the tool for architects to communicate with the others (clients, colleagues or other interested parties). It is a way of visualising thoughts for production of ideas in order to create something physical. As architecture is about creating, representation of thoughts visually becomes very important. Christopher Alexander (1964) believes that one of the major problems in architectural design is the tendency to formulate questions verbally. Therefore, he wants to decompose each design assignment into concrete, partial problems, solve them and integrate them into a hierarchical whole instead of working with abstract linguistic concepts. Representation is the production of thoughts via visual imagery. It happens in creative thinking, or in problem solving that requires insight. Representation of an abstract idea is achieved through sketches, diagrams or a design proposal.

Sketching and diagramming happens in the beginning phase of design. The aim is to record and represent thoughts that are already in the mind, similar to writing as a way of symbolic representation. Moreover, sometimes sketching and diagramming does not follow ideas in the mind but instead precedes them. Goldschmidt (1994: 162-164) agrees with this by saying;

> ''Architects quiet often engage in sketching not to record an idea, which is not there yet, but to help generate it ..Seeing something as something else (which is not there physically) is the essence of imagery, and in this case imaging is brought about through sketching, which is called *interactive imagery*.''

Ways of representations differ in relation to the information that they obtain. The more information we have, the more detailed the representations become, from abstract to concrete. Design concepts do not appear, in their totality, all at once. Designing is a process that involves systematic transformations. One can or should see the continuity of the design process by looking at these transformations. The process of representation happens differently in individual design or in collaborative design.

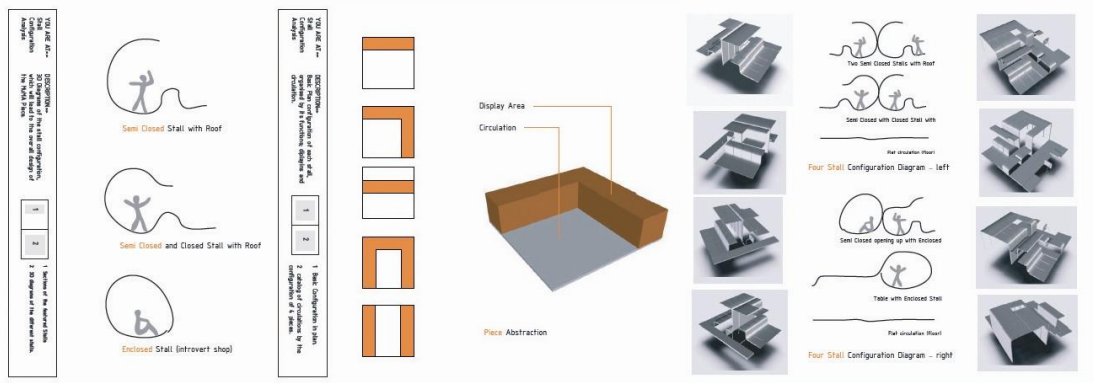
Traditionally in individual based design studio structures, the ways of abstract representation happens with sketches and concrete representation happens with ruled based drawings such as isometric perspectives, scaled plans, sections or elevations.

Bigger scales of drawings represent abstract representation, where one can start to visualise the concepts of design, where as smaller the scales become, the more concrete design would become. Detailing allows ideas to become concrete. For Goldschmidt (1994: 160) in individual based design;

> ''The use of representation meaning visual thinking or imagery in the making of form represents the artistic aspect of designing, seen as characterized by intuition, responding to aesthetic and emotional needs and not necessarily to rational ones. The design process is, of course, regarded as also including rational aspects, subject to logical, functional and 'scientific' analysis and compatible with implementation requirements. The balance between these two perceived poles of designing, and expectations concerning their respective contribution, depends primarily on the design culture that one subscribes to.''

In individual based design, one can see that representation becomes something very personal. While sketching, during the process of design, the student can be very concise and blurred, using very personal notations. As described above, the process depends primarily on the one. It is not a scientific process but more like an inventive process based on formalistic worries, which is not relevant for research based design. One can never escape from known spatial configurations and forms without research. In the era that we are living in, where the process becomes as important as the design itself, individualistic approaches loose their value.

Sketching is not very appropriate for collaborative design because of the properties described above. Apparently, visual thinking and presentation talents become more important in collaboration based design studios, as communication between members occur through representations. In collaboration based design studio structures, the ways of abstract representation happens with two-dimensional or three-dimensional diagrams for research-based design. The more the design becomes concrete, the more the diagrams become detailed. Different scales of the project is handled by different members of the team, allowing detailing in variety of scales, hence having a more concrete project comparing to traditional design (Illustration 3.4).



[a] [b] [c]

Illustration 3.4 Diagrams evolving (a-b-c) through the transformations of different group members.

Alexander (1964) defines the diagram as any pattern that, by being abstracted from a real situation, conveys the physical influence of certain demands or forces. Nobre (1999) explains the use of diagrams as:

> ''The diagram allows the designers to reverse the process: the 'knowledge' comes through the diagrams' operation, opening up the process from pre-determined typologies, pre-given concepts, towards unforeseen forms and organisations, a 'decoded architecture'. New techniques (mainly digital) are used to generate a 'new architecture', in which diagrammatic techniques are central to speculation.''

Through diagrammatic representation, the students communicate with each other, transforming one another's diagram for the production of design. As a result, the diagram becomes the tool for the architectural discourse and production. There are diverse conceptions and uses of diagrams. Alexander (1964) differentiates diagrams between form diagrams and requirement diagrams. The first is a representation of the form; the latter is a non-iconic notation of some constraints or properties. A requirement diagram is useful to designers insofar as it implies something about form. In other words, requirement diagrams contain elements of form diagrams in them. A form diagram, on the other hand, is useful only if its functional consequences are foreseeable (Illustration 3.5). According to Alexander (1964), a diagram becomes constructive if it is a requirement diagram and a form diagram at the same time.

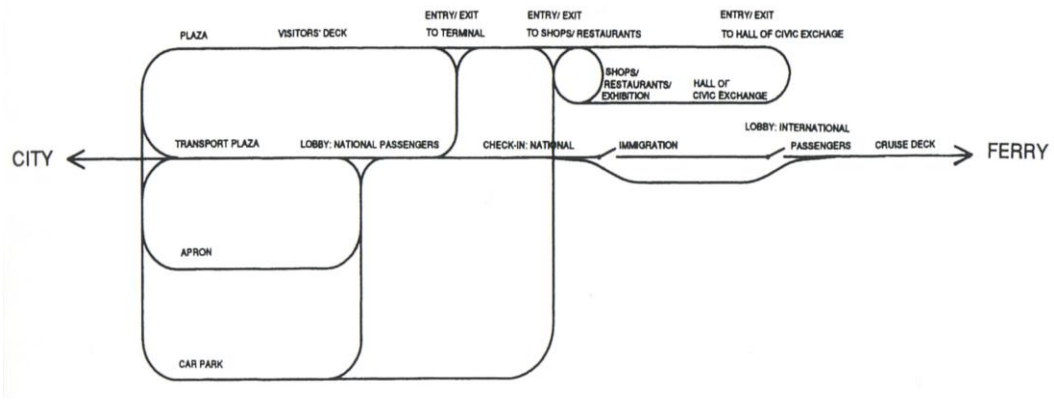


Illustration 3.5 Diagram on the programmatic relations by FOA (Soriano, 2002: 67)

3.1.3 Evaluation

Design improves by evaluation. In certain stages of the design process, every design is evaluated or tested through the main design criteria taken in the beginning of the design process. In another way, thinking by gradual evaluation is to decide by judging through alternatives by which mean to make a step towards concrete thoughts. It is always important to save the different stages of the design in order to have a memory of the project. In case it is needed, the designer should always be able to return to the previous versions of their project, in order to criticize and take out the good parts of the previous versions.

Evaluation, meaning critic, could be self-critic or being criticised, allows one to understand himself, his personal ideas by discussing with another, or by expressing himself to another. In order to evaluate one's success of problem solving or where he/ she stands, one should talk about their design experience through concept design to development. By doing so, self-consciousness is achieved. For Ledewitz (1985), self-evaluation or 'testing' in the design process, must become a second nature to a designer, which would allow them to bring feedback to their designs.

Individual based design studios, self-evaluation is most of the times very difficult to achieve. If the students are not mature enough to criticize themselves or if they identify themselves with their work, it is almost impossible for them to see the functioning and non-functioning parts of their design, as well as to evaluate their own design directions. However, in collaboration based design studios, as design is a

collaborative work, the students are continuously interacting with one another, thinking loud on the project, which allows continuous evaluation throughout the design process (Illustration 3..6). Every idea develops with critics, and forms the design knowledge in a studio medium. It is important that a design studio to create a discussion platform for the visualisation of the ideas.

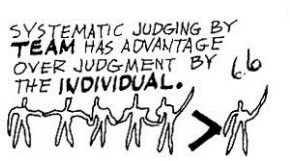


Illustration 3.6 Systematic judging by a team (Caudill, 1971: 145)

3.1.4 Development

One way to develop a design is to add technical requirements to design problems. By placing emphasis on a body of technical knowledge, the design studio can force the integration of seminars, lectures and the design process. This integration can occur in a variety of different ways: specialized studios can focus on particular areas of knowledge, or lectures can be introduced to the key points of the design process and finally structural and technological concerns could be integrated. Students may visit project sites to meet contractors and craftspeople. It allows them to 'build a respect for the contractors, masons, material manufacturers, and an understanding of the collaborative nature of contemporary architecture and construction'.

For developing a students theoretical background, the 'design topics courses' should include a broad range of design issues. Courses, which focus on areas of research or current trends in architecture, can illustrate to students the complexities of the profession and encourage them to increase their knowledge base. These courses could cover a wide range of topics, in example designing for the physically impaired, the history of the profession, and designing for specific climates. These types of courses, though they may also seem to be easily categorized as 'support courses', should be emphasized as 'design topics', as these types of subjects relate directly to

the nature of the profession and to the effective design of the environment in today's society.

In universities, the periodical libraries for following the current discussions and libraries for general research are the tools for developing ones self-consciousness. Also virtually through the computer labs, World Wide Web and database browsers can reach to limitless information. These tools should be accessible by all means for a research aimed institution.

With the use of all these inputs, embedded into the design studio structures, research, meaning concrete, objective and scientific knowledge based research, will allow improvement of oneself, developing the design studio and the process.

3.2. Design studio members

Design studio has a highly complex structure with different members, which could be classified as tutor, student and computer. Of course, computer is a new member in a design studio, as it has been started to be used immensely in the design process recently in our era. In order to understand the structure of a design studio, we should meet the different members of it thoroughly.

3.2.1. Tutor

A tutor is the one that is more experienced in design. He has the potential to foresee where a project might lead. His duty is to guide and help the student whenever it is needed. In a design process, when the students get lost in their ideas and projects, the role of the tutor becomes very crucial. As an outsider's view of the project the tutor can give valuable advice and critic that, the student might not have realised before.

The tutor has a role that is through verbal communication, he tries to understand the personal sight and the aim of a student. The studio tutor has an important input for the awareness of a student of himself and his project. Many times, because of problems of visualization and not having enough knowledge on existing architectural languages, the student cannot totally express his/her thoughts. In that case, it is not sufficient to understand the students just through personal expressions. For that reason, reciprocal communication is very important and is not easy to achieve.

A tutor cannot teach how to design, but in design studio environments, he/ she can only create a medium that would allow the students to learn how to design, or else can teach them how to learn designing. Cook (2004: 17) exaggerates his thoughts on this as;

> ''The teacher should learn from the students.''

In any case, in undergraduate level, the design studio medium should be stimulating, whereas in postgraduate level it should be simulating. In undergraduate level, tutor has to teach the abstract way of thinking, in order to feed in creativity. The aim is to teach the ways and which's for beginning to design.

For Ledewitz (1985), all the aspects of design education- the skills, the language and thinking architecturally- are more effectively taught through experience than taught directly by explanation. Other disciplines and sometimes even we as tutors criticise the ambiguity of design studio tutoring. Sometimes we find ourselves get caught in concept level. However, the solution lies in focusing on architectural design studios as a source of reaching concrete design thoughts at the end of each design studio periods.

As architectural education is seen as an apprenticeship, most of the times the students see the tutor as a master, as described in the movie Star Wars.

According to Ayiran (1995), today the information explosion related to design knowledge and the surprises that the wide plurality of architectural medium created is immense. The problems associated with following, understanding and commenting on these issues are reflected to the education in design studios, complicating the duty of the tutor comparing to the past. In order to compete with today's needs of design studio tutoring; the tutors prefer to work in teams. The team teaching allows them to share the responsibilities, as there are not any more tutors that knows or that is expected to know everything.

3.2.2. Student

A student is the one that is eager and full of enthusiasm to learn. A student is not very experienced in design and has many ideas that have the potentiality to become. The personality of the student is very important. The way they see life, defines the path they would choose for their designs. Architecture is a way of living and in order to become a good architect, the student should understand the importance of the profession becoming part of his/her life.

During a design studio-tutoring period, the student learns while designing. At the end of the design process, he / she has to have a final design product. However, the fact that a student designing does not always show the fact that she or he learns. The process of the design studio obtains or explains the meaning of learning to design, but even though it is not proper, the product certifies the learning process. Therefore, both the design process and the product become an important and a necessary for learning to design. For this reasons, the student's duty is difficult in all the levels of design. In any case, certainly in a postgraduate level, the position of the student is different, as he / she has to be involved in dense research in relation to the interests and expectations of the design studio's research agenda.

3.2.3. A new member: computer

In a design environment, computer is a tool that should be used in every stage of the design work from the technical drafting to design development and modelling, and from presentations to diagramming. For Mitchell & McCullough (1995), computer is a processor that transforms the information we have into information that we want.

In the first years of design education, the tutors have to be very careful with the use of computers in the design studio environments as the students can encounter some problems. These problems are most of times associated with three dimensional understanding of space and describing ones ideas architecturally. It is important to keep a good balance of physical modelling, digital modelling, drafting and sketching in the first years of studios, to solve these problems. The sooner the students meet the computer, the better they would improve on contemporary design techniques. As Steele (2002) claims by letting the computer take the lead, some designers have

opened the door for an evolutionary design process. More and more, the new generations will start to work with computers by the time they start to read, write and talk. The computer will and is already starting to take the place of a pen in expressing the ideas of the one. In the book ' How designer's think?', Lawson (1980: 187) had already stated his ideas on the position of computer in the process of design by saying;

> ' 'It is already apparent that computers may be expected to play an increasingly important role in the process and this may well influence the way designers think.' '

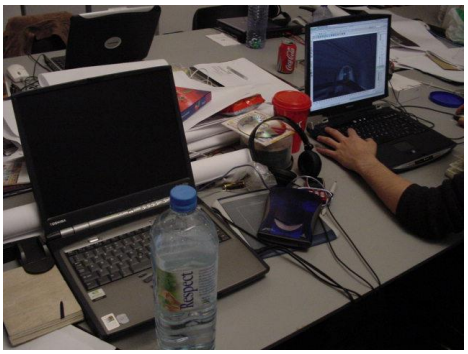


Illustration 3.7 Computer in the design studio

Computers have revolutionized architecture, raising deep philosophical issues that are forcing a paradigm shift in the profession, as well as allowing architects to implement complex geometries. Initially seen as a positive breakthrough that would make previously inconceivable projects possible, computer-aided design programs are increasingly being viewed as a mixed blessing that must be carefully accommodated in order for architects to retain creative identity (Steele, 2002).

Many famous contemporary architects have stated their opinions on the meaning and the performance of computers. Below are some of them:

> ' 'The computer has precipitated a fundamental re-evaluation of space and time, the transition from a pre-industrial condition to cyberspace taking place in about a century.' ' (Steele, 2002: 21)

> ' 'Computer is a tool that gives you direct conclusions. Computer as a knowledge generator.' ' (Van Berkel, 2004)

> ' 'Computer lets you do new things and it provokes unprecedented thinking. It is the right tool to do complex things.' ' (Lynn, 2002)

> ‘‘The computer allows you to collect different kinds of information and visualize them, and to model and simulate potentials. It allows you to incorporate processes surrounding a project and lets you to use them as formal and organizational arguments to construct the project, rather than relying on stylistic expression or historical precedents.’’ (Zaero-Polo, 2002)

These remarks show the importance of the computer becoming a part of each and every step of the design processes. By allowing computers to be used in the design studio environments as a knowledge generator, the students will learn to express themselves in a way that they have never used before. Since the early stages of the computer-generated design will provide an array of options for an initial design proposal, which further ahead will get narrower according to the information that is inserted in the project. Therefore, computers and computer-generative design will be seen more often in design education as a new member in the studio.

4. THE INTERRELATION OF DESIGN STUDIO MEMBERS

The best way to describe these design studio structures is through the interrelation of the design studio members, as their interrelations create the design studio atmosphere.

4.1. Individual based design studio structures

An individual based design studio structure is composed of students that work as individuals. The number of students differs depending on the number of tutors. Generally ten to twelve students per tutor is the average number for a balanced design studio.

4.1.1. Tutor-student interrelation

Ayiran (1995) explains the tutor and student interrelation as;

> ''The design education in design studios is based on one to one interrelation between the tutor and the student and personalized education that is valid in most design studios, is the most strong and the modern pedagogic approach appropriate part for this kind of education.''

Within the studio environment, a good dialogue must be established, not only within fellow students, but also between faculty and students. It should be pointed out that true dialog takes place only among equals, there can be no healthy dialog across the boundaries between for instance masters and servants. Creating studios and environments where the tutor-student relationship is replaced with a colleague-colleague relationship will go far in eliminating the social and political structures that have perpetuated the status quo in architectural education.

4.1.1.1. Unit master

This kind of a system relies on the interrelation between the tutor, as the unit master and the student, as an individual. The critics are made in a one to one dialogue between the two in a private manner.

Some problems might occur in such a system. One of the problems could be if the student and tutor's interest does not match one another, the student gets into a position where he/she cannot get any benefit from the critics. The personalities of the individuals become the strongest element in such an environment. Another problem can be defined as in many cases it is inevitable that the student or even his/her work becomes identical with the tutors. Such problems occur when the student takes the criticism without any judgement and apply it directly to her/his design without putting any input or effort from himself/ herself. The students should be encouraged to understand the critics thoroughly. The tutor should achieve this through verbal critics, instead of sketching the work out for the student.

4.1.1.2 Pool

In a pool structure, the students visit the tutors in order to get critics about their work. One of the advantages of this system is that the students can talk to many different tutors within a design period.

The tutors have a card relating to each of their students. In the card the definition of a student is identified. It is in a way id card of their work. The tutors can see the remarks of other tutors on the card, so that they can make different critics on the students work. This system brings out the 'personality' of the students. However, if a student has some personal problems, it would be difficult for her/ him to deal with design, as they are most of the time alone on their own.

One of the disadvantages of this system is that it gives a lot of responsibility to the students, as they have to come and interact with the tutor that they choose. As such, it might also be difficult for some introvert students to interact with tutors. The students have to be very strong, as the responsibility of tutoring of the tutor is almost demolish. This system cannot be applied for all the student typologies.

4.1.1.3. Rotation

In a rotational system, the tutors change their teams of students within some intervals of time. The number of students in a team is ten to twelve individuals.

One of the disadvantages of such a system lies in the harmony of the tutorial team. If there are some conflicting ideas within the team of tutors, this effects the judgement of the tutor against the student.

In the former tutor-student interrelation, at least the student has the right to get a critic; from whomever he/she want. However, here he needs to get a critic from each of the tutors. This might result in the lack of unity in the design proposals of the student, as being fed by variety of ideas some of which may surely be in conflict, would influence her/his negatively. The tutor may not be able to witness how the student reflects to his/her critic or whether he/she understands the critic.

4.1.1.4. Team-teaching

The tutors go to a design studio as a team. They give critics to the students all together. Team-teaching allows collaboration to occur between tutors with different interest areas. In some occasions, tutors form interdisciplinary teams depending on the complexities of the research agenda.

4.1.2. Student-student interrelation

In a studio environment, the interaction of the students is crucial. The students should be encouraged to share their ideas, in order to broaden their horizons. The more they share, the easier they would reach to the new sources of information. In addition, by giving critics to one another, they would also learn how to analyse, filter and restructure information. It is always easier to have a dialogue in between equals. Arden (2003) says:

> ''Give away everything you know and more will come back to you.''

However, it is true that this kind of a studio system raise excessive competition. To achieve Arden's initiative is quiet difficult. Excessive competition in turn promotes

the concept that creative ideas are highly specific to the individual designer and that truly creative ideas can never be arrived at in a team decision-making situation. In such design studio environments, competition is inevitable. Hence, if it turns into individual competition, it can result in a hazardous way. Instead of motivating themselves, the students could be detached from their own work if they cannot start to compete with the others, resulting in a depression. In studio atmospheres where individuality and top-designer psychology is precedence and encouraged, there is a risk of students not listening to one and others critics. As a negative behaviour, they tend to isolate themselves in order not to be influenced from the others, or they do not care about the others critics, as they feel superior to them.

Even though the students have separate responsibilities regarding their work, if they have common features in the duties, they could share their ideas more comfortably, such as sharing the information about the site or the same programmatic layout. The design results of such a studio environment would also be more enlightening as the students would have the chance to see the different approaches within similarities.

Students can also be divided into teams for teamwork depending on the scale of the project. Generally, teams of students handle the site analysis or survey of the project site. Alternatively, in the first year studios, one big project site might be given in order for the students to design together. The students could also focus on different parts/ details of the team design.

In most cases, promoting site trips to other cities creates a harmonious atmosphere in the studio teams. Through the trip, the students find diverse platforms to know each other and communicate with one another.

4.1.3. Student-computer interrelation

In an individual based design studio structure, the use of computer mostly occurs in the development and the simulation stages of a project. Mitchell & McCullough (1995) explains the process as;

> ‘‘The use of abstraction hierarchies, aliases, and default values removes the traditional distinction between conceptual design and design development and eliminates much of the

> labour of design development. A fully developed design exists, in unrefined form, as soon as a basic concept has been sketched. Then variations on the theme can be explored, and details can be refined, for as long as time and interest permit.''

While using computer in their projects, students gain certain benefits. For Mitchell & Mc Cullough (1995); first of all they gain a productivity benefit, it allows necessary design work to be done in the same amount of time of a hand drawn project, hence allowing modifications through to the final design, because it creates opportunities to undertake additional work (a marketing benefit), or because its use adds value to design products or services. (A quality benefit) Working with computer, allows precise, clean and neat drawings or presentation products of a project. However, in order for them to be satisfying visually and full of expressions of the one, they should contain lots of information, usually more than hand the required level of a hand drawing.

The automation of the document-production process, standard details, building code requirements, and other information needed in design development and document generation may yield further efficiencies in computer drawings. However, it may also result in having students using standard details, graphic layouts, or any other features related to design without questioning enough the information that they obtain.

Using more sophisticated design tools, such as complex soft wares to model, calculate, draw the students try to simulate the specialties of their designs. Animations through the 3D Model (eye level or bird fly), Photoshop plays of the design insitu by using virtual 3Ds or photographs of physical models, drawing one to one details with precision could be some positive usage of computers in individual based design studio structures.

4.2. Collaboration based design studio structures

Collaboration-based design studios aim to create a studio environment that focuses on research, techniques and process, in the production of 'new architecture'. In collaboration based design studios, the students form teams and the design work is handled by the team. The research process is communal, towards a specific aim that

a team defines in relation to a research agenda. The students work in-team, having collective proposals, addressing common topics, and sharing techniques. The research develops through workshops, seminar courses, common tasks, and by the relationships established between students and tutors. The students get to know better what other teams are doing regarding techniques and concepts (Illustration 4.1).

Illustration 4.1. Collaboration based design studio- design members of different teams are working altogether on different projects.

4.2.1. Tutor-student interrelation

In collaboration based design studio, each team works with a tutor. The tutorials of the team with the tutor happen occasionally depending on the schedule of the tutor. Every three weeks there are team tutorials with all the tutors. Each tutor has 2 to 3 teams under his supervision.

The tutor is more like an organizer of the whole system. The student teams are most of the time alone working on the project and the tutor comes to give critics in certain intervals of time. He acts more like a tutor than a professor that guides the work. He offers a range of options, instead of solutions. In the critics, he tries to find out the efficiently working parts of the team as well as the non-working parts. According to his observations, he gives suggestions for the work of the team as well as the individuals. In some cases, he gives small tasks to individuals, in order to solve the problems of the team and of the design. As the studio environment e is similar to a

professional office environment, depending on his/her interests the tutor interacts with any of the student in his/her team.

Another fundamental thing in a design studio is to be able to understand the brief of a project, fully and profoundly. For that, the communication between the tutors and the design team should be fluid. The data transfer between the two sides in the crucial moments of design should be accurate which will allow the tutor to be involved more in the design process.

It is imperative to remove the hierarchy which exists within the design-studio itself. In this type of studio structures, design studio environments where the tutor-student relationship is replaced with a colleague-colleague relationship, as well as supporting consensus-based decision-making via the community design studio or other related options, go far to eliminate the social and political relationships that have helped to foster the current feeling of isolation and separation in a design studio.

By placing emphasis on the relationship between the architect and the community, collaboration-based design studios eliminate the importance that has been traditionally placed on the relationship between the tutor and the student. Here, the master/servant relationship, which prohibits the occurrence of a dialogue, is eliminated. Now that a discourse is possible, the role of the tutor changes. It becomes his/her responsibility to facilitate a dialogue and to encourage equal participation among all the members of the team.

In this scenario, students are more readily able to understand their role in the design process. They feel empowered and more in control of the design decisions they make. Team evaluations that take place among equals (faculty, students, and members of the community) eliminate the anxiety that usually occurs with the typical design jury. Students also gain valuable experience in evaluating their peers and learn not only how to discuss their own projects, but also obtain experience in communication skills.

4.2.2. Student-student interrelation

In this kind of studios, the students work in teams. A design team is composed of minimum three to maximum five students. The aim of teamwork is to create a discussion platform during the whole process of architectural design. This can only be achieved through the collaboration of minimum three students at a time, as with two student groupings the discussions ends within a short period, as negotiation of the two is much easier than the negotiation of three. Triple grouping is more dynamic than double grouping. Busseri and Palmer (2000:224) define teamwork as:

> ''A small number of people with complementary skills who are committed to a common purpose, performance goals and approach, for which they hold themselves mutually accountable. Team-work is also said to be characterized by: helpfulness, coordinated effort, a shared approach to working, open communication, and friendliness.''

As seen in the description, there are no hierarchies in a team. Each member has equal rights in a democratic environment. They have the power to change or lead the design wherever the team wants. For Caudill (1971) the formation of a team depends on two things;

> ''Once there are empathy and communication among members, the team will move and every member will benefit. Without the two, people cannot work together. Without the two, there is no team.''

Negotiation is the keyword in collaboration based design studio structures. The students are most of the times in contact, as communication is crucial. Most of the times, they work together, and learn from each other. Information is shared through the studio medium. For Nobre (1999);

> ''The students are organised by projects and establish a network of relations between them to share techniques, and to discuss and give scope to the collaborative studio's agenda.''

The competition increases as the level of interaction increases.

Laseau (1989:219) gives advice some important tips for team working;

1. Accept each other's contribution to the situation as having equal potential.
2. Place personal goals below team goals.

3. Help each other by concentrating on each member's input.
4. Have your sense of humour ready and use it.

Some of the consequences of the student-student interrelation can be explained by the uniformity in the project, duty share in the team and the communication medium in the studio.

4.2.2.1. Uniformity

The homogeny of a design team defines the completeness of the project. The more the individuals in a team get use to each other, the better conversation they have with each other (Illustration 4.2). Communication and understanding each other is the most important task in design. The design language becomes more defined in a homogenous team.

Illustration 4.2 Harmony of team members for a uniform project (Caudill, 1971: 82).

United Architects is an international coalition of six innovative architectural firms, who share a desire to design new visions for buildings and cities that reflect the way we live today. An interview with Kevin Kennon, one of the founders of United Architects puts forward the ideas of uniformity in the project as;

> ''A true collaboration is a matter of chemistry as well as an ideological connection. You cannot simply say 'here's your piece and here's my piece, this is my boundary and that's your boundary'. We wanted to create a unified version whereby we would draw upon the respective talents of each individual and hopefully create something that was greater then the sum of the parts.''

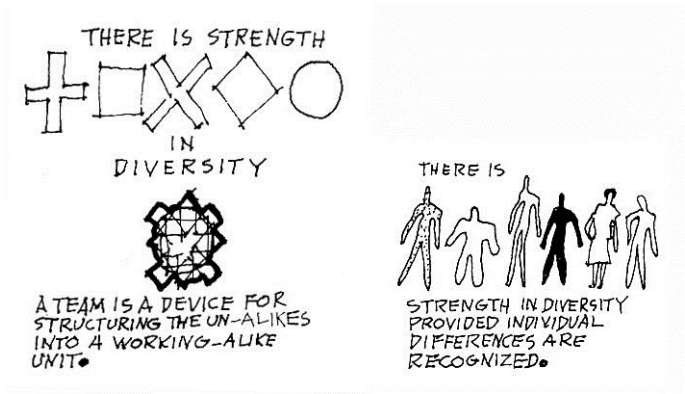


Illustration 4.3 Diversity in team members, enriching uniformity in design (Caudill, 1971: 80).

4.2.2.2. Duty share

Making research a partner in design by bringing it into the design studio is the only way to encourage architects/students to be researchers to welcome a dialogue. Through this dialogue, architects will learn that architecture is not an autonomous discipline. They will come to realize the inter-connectedness of knowledge and understand that our real-world problems are interdisciplinary and can only be solved by working together. Within a design process, the roles and duties of the members change depending on the interests and the needs of the project. In the end of the design process, each member would inevitably be specialized on one aspect of the project.

Within such a design environment, the definition of the design process becomes the most crucial. The work is divided into different segments with each person associated with it. Sophisticated networks are developed in which (as in human resources) there is division of labour and specialization of roles.

In most cases, the roles in a design team are defined in relation to computer software that the students use which is actually related to the design task that the individual handles. One defines his role as a 3D Design software user like; Maya, 3D Max, etc…for the visualising the project or 2D Software user like; AutoCAD, Illustrator and Flash for diagramming, presentation and technical detailing. In teams that are more organized, it is seen that the role of an individual is clearer by means of doing

tasks. The amount of software that he/she use is less than an individual in a less organized team. This idea is supported by the questionnaire that is done as part of this research; and it can be observed that in most cases the members associate themselves in relation to their skills.

Having in mind that the entire individuals are a designer and the roles can overlap, some roles in a design studio can be defined as;

Technical drawer: person that uses AutoCAD Architectural Desktop© or a 3D Program, solves the technical problems of the project, working closely with the model maker.

Model maker: person that uses 3d studio max, rhino, Artcam© for CNC machining, as well as physical modeling tools for wood, metal, flexi glass, etc …

Presentation and diagramming: person that uses 2D programs like; Corel Draw©, Adobe Illustrator © - Indesign © - Photoshop © - Premiere © - After effects©

Visualization: person that uses 3D programs like; Maya ©, 3D Max ©, Rhino ©, etc … Works with render images, animations, fly through, etc …

Sometimes the duties are also differentiated as short term and long-term duties. Short-term duties happen when there is a deadline and if one of the members needs help in his/her.

It takes time and courage to establish a posture within the team as there is a collusion risk of two people's interests. In some cases, one might need to change direction, in order to fit into the track of the team. Professionalism is essential. There are lots of negotiations as well as hierarchies that emerge within the teams. Here the designer is not just an architect but is a scientist that has the capacity to analyse, research and interpret knowledge.

The information created during the process of design is collected in a project database system, where all design decisions and changes are recorded providing a definitive, up-to-date source of information about the current state of the design. Design team members use the relevant data within the database that are appropriate

to their needs and roles. However, there is a risk of loosing the track of changes and lose control of design direction when different members of a design team operate on the database. The best way to prevent this is to have regular meetings within the team and taking the important directional change design decisions altogether. A designer working individually on a project needs access to the entire project database. However, in a design team, not all the members are responsible for all the parts of the design. The team members work on their parts and provide access to the other members on only respective areas, where they can see and manipulate and perform their tasks. This prevents unauthorized changes to data, minimizes the possibility of accidental data loss or corruption, and provides a way to control access to any confidential or sensitive information in the database. Generally, all the members are responsible for overall direction and management of the project together (Illustration 4.4).

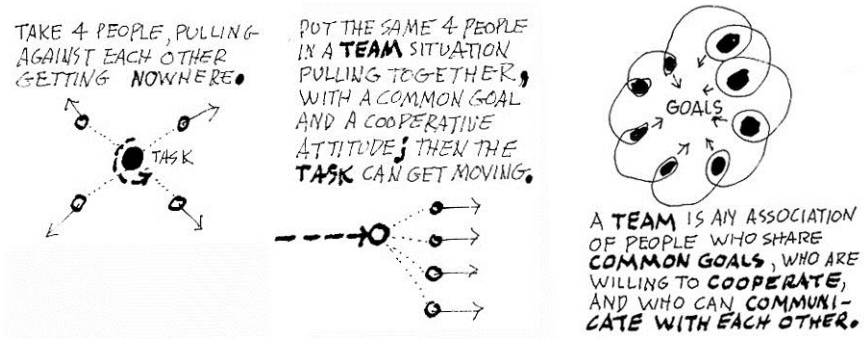


Illustration 4.4 All the members is responsible for the overall direction and management of the project (Caudill, 1971).

The architectural studio is a simulation of real life, where the studio members are a part of a play, with certain roles and responsibilities. They perform within teams with certain hidden rules that are defined by and within the system of the design studio society. In order to secure a place within the team, one has to struggle and find a way to convince the team members of his/her capabilities, as each team can take a team decision to fire one from itself. For Caudill (1971), one would feed in the teamwork by being actively involved in team actions (Illustration 4.5).

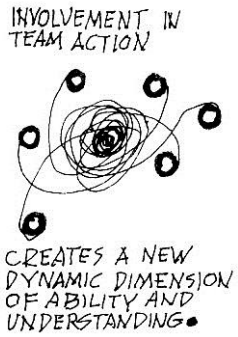


Illustration 4.5 Involvement in team action (Caudill, 1971: 74).

This kind of a system allows students to be prepared for the practice world after graduation. A transmission period for preparing themselves for different roles they might encounter in the practice world.

4.2.2.3. Communication medium

In a design environment, the most important thing is the communication. Especially in a collaboration based design studio environment, communication becomes a more crucial issue as the project is designed as a team. The students share ideas and information in order to communicate with each other and share one and others knowledge and ideas (Illustration 4.6). The success of a design studio depends on the achievement of communication. There can be many tools that are used for collaboration with the use of graphic thinking skills like modelling, drawing, diagramming, etc ...

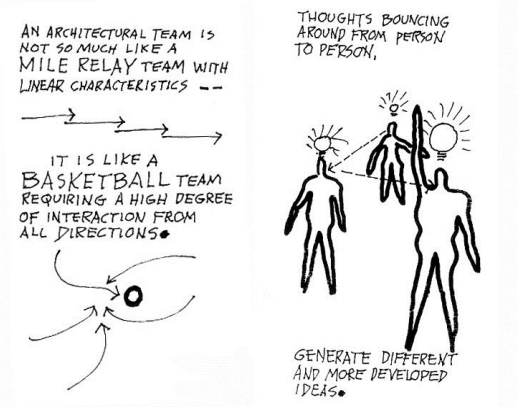
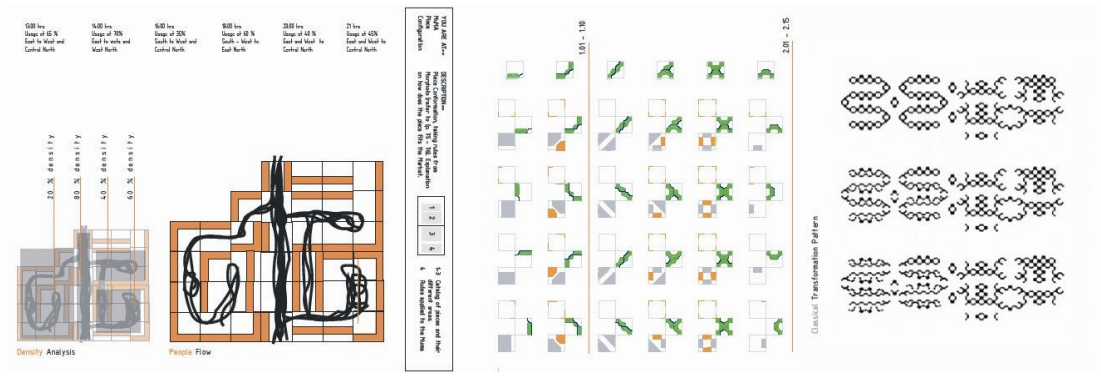


Illustration 4.6 The communication of ideas between the members (Caudill, 1971: 69).

In a collaboration based design studio environments, the relation between the collected data, analysis and the design of the form is achieved through the use of diagrammatic operations, that is handled as a team. The architectural decision comes out of this process, which brings in some questions. For Nobre (1999);

> ''This opens questions of editing, the architect's role within the design process, and the re-thinking of what constitutes architecture.''

A diagram expresses the design knowledge put forward by an individual. It remains always available for retrieval and manipulation. It is then taken by another individual to be transformed to other design information. The interpretation of knowledge is achieved with the use of diagrams and the communication language of the members is diagramming (Illustration 4.7).



[a] [b] [c]

Illustration 4.7 Diagrams evolving (a-b-c) through the transformations of different group members

Each student transforms one another's diagram through the networked computer environment. Also sometimes, the daily conversations take place in the virtual space (Illustration 4.8). This may result with misunderstandings. As in a way a diagram is a tool for interpretation and a speech through net work talk tools (such as LAN talk or Windows Messenger) most of the times creates different visual understandings of the same object. For that reason, it is not difficult to understand an old saying;

> 'The language of an architect is his/her drawings.'

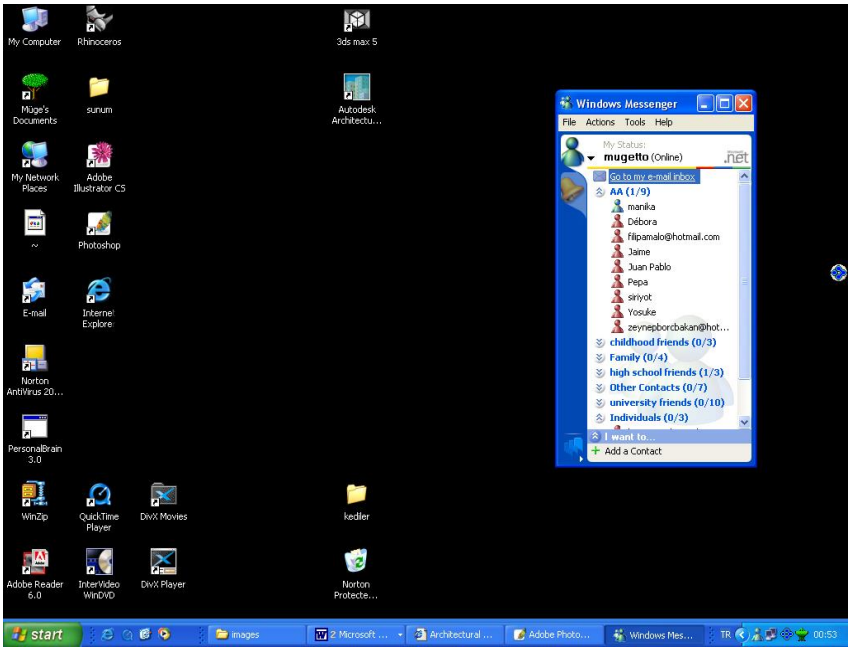


Illustration 4.8 Use of messenger during a design process.

Most of the times the team discussions are done as a way of brainstorming. Laseau (1989) explains the process of brainstorming as;

> ''Alex Osborn developed a method called brainstorming that helps to keep the channels of thinking open. He identified four rules that must be followed to generate ideas within a team during brainstorming:
>
> 1. suspend judgement on anyone's idea
> 2. Free wheel, let your imagination roam
> 3. Strive for quantity of ideas.
> 4. Build on each others ideas.

After the brainstorming where many decisions are made, it is most of the times (especially in the design stages) unavoidable to foster some surprises. The student with the duty of visualization may create something unexpected in relation to the expectations of the team, as sometimes the decisions are taken verbally. For that reason, it is very important for one person in the team to visualize the discussions during brainstorming (Illustration 4.9).

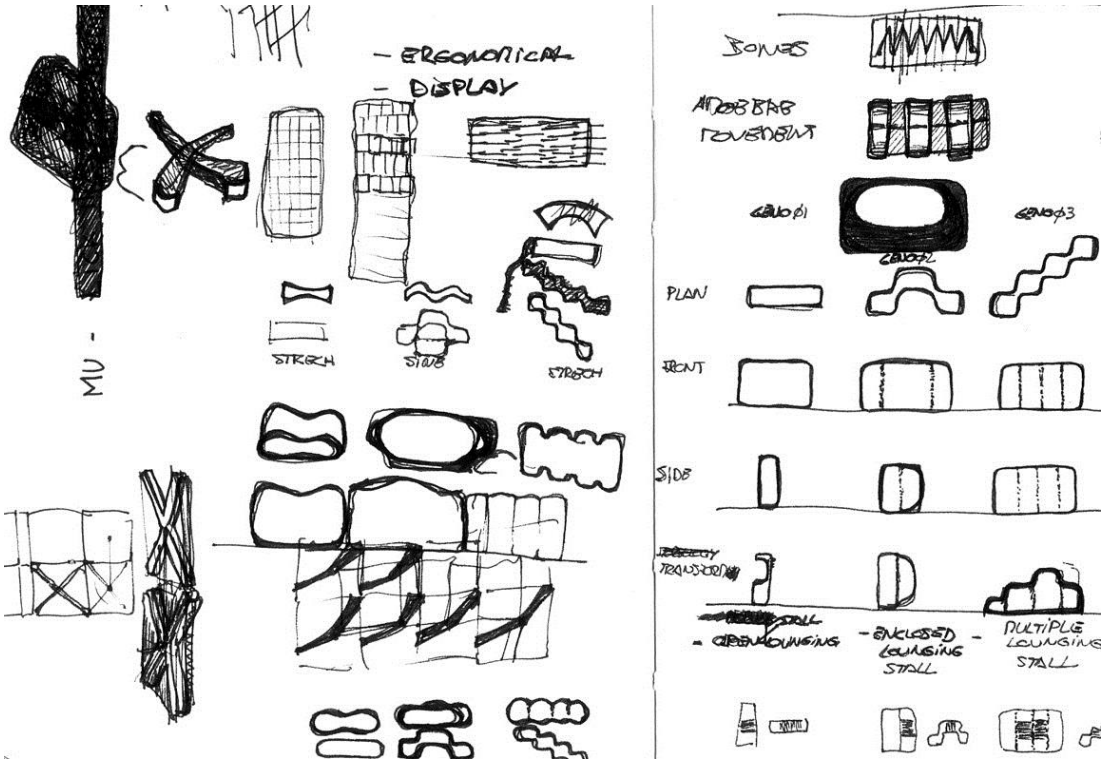


Illustration 4.9 Visualization of ideas during brainstorming session in MuMa

In order to accelerate communications in a design environment, there is a need to have a very good infrastructural network through the design studio, which can be composed of a LAN - cables and connectors, a server and networking software. This eliminates the costs for physical production and circulation of documents allowing free access to all the work that is produced within the design studio. As the cost of recording information, moving it from place to place, and translating it into different formats as required by participants in the project. The use of network systems is a solution for this reason. For Mitchell & McCullough (1995);

> 'Better communication leads better coordination of work.'

4.2.3. Design team-design team interrelation

The design teams form small offices, and within the collaboration based design studio environments, these small office-type organizations compete with each other. Within such an interaction of design teams, cheating is allowed. Many times ideas fly around the studio, travelling different design teams, generating new ideas.

There are many politics in between the design teams. The team members become a valuable stock for each team. Sometimes there are transfers of team members in between teams. The stock of a team depends on the qualifications of team members.

In all the resolutions and decisions within the design process, as well as for the presentations, each team of students is encouraged to create its own narrative, language, style. They are expected to explain the process that formed their projects. Creating a team identity is extremely important and shows the togetherness of the team; therefore, each project has a harmonious name, graphical layout and context (Illustration 4.10).

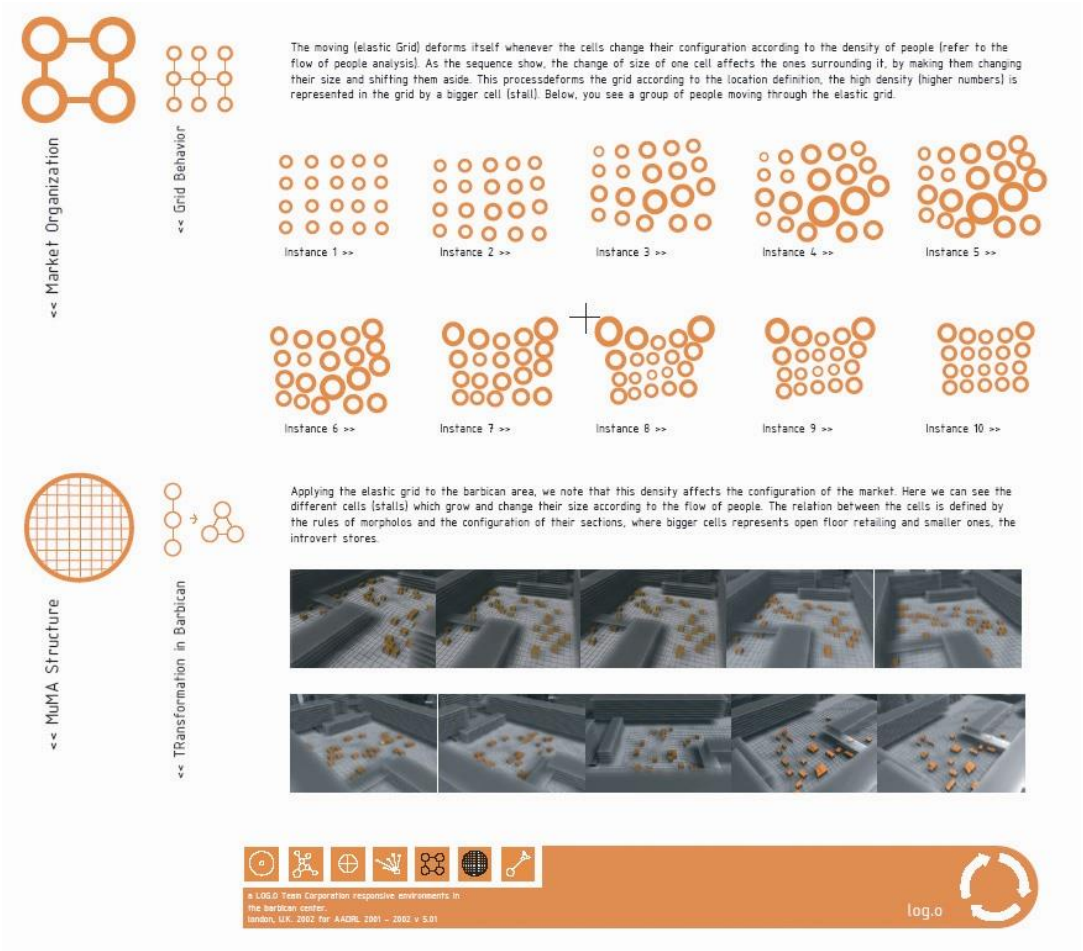


Illustration 4.10 Log. 0 team, graphical layout for MuMa project.

4.2.4. Tutor-tutor interrelation

The tutors also work as a team within collaboration based design studio. They create the research agenda together. In the beginning of the design phase, the tutors give critics together. Students are surrounded with a variety of ideas, none more important than any other is. In the later stages of design, the tutors share the teams among themselves in relation to his/ her way of approach to the agenda. The typical design studio, with the viewpoint of one tutor, often eliminates the introduction of multiple views into the studio. The design process is never a singular endeavour and on a daily basis, architects must grapple with the varying opinions of a large team of people. Learning to come to terms with this type of environment as a student can only lead to a better understanding of a team design situation.

Team-teaching brings together a team of specialists and sets an example of collaboration, which illustrates that multiple opinions and perspectives are not only valid, but also highly desirable (Illustration 4.11). The team-driven studios can offer a means to overcome the problems associated with narrowly focused, solution oriented studios in which most issues are subordinated to a constrained notion of architectural design in which architectural form dominates.

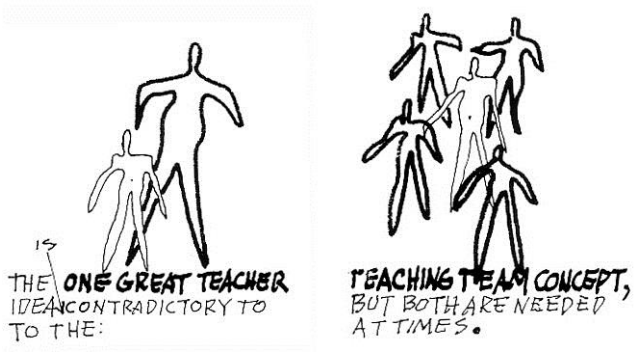


Illustration 4.11 Tutor- tutor interrelations, (Caudill, 1971: 168).

The structure of a team-teaching team, involves specialists of different issues within architecture. A team composed of theory based tutor, design based tutor, practitioner tutor and organizing tutor could be a good mixture of specialists of architecture. It is important that even though they are involved in different issues within architecture, their approach towards the research agenda should be in harmony, in order to

complete one another. As well as architecture based tutors, some faculty members outside architecture are involved in the studio environment. By doing this, students have the opportunity to learn from faculty in Natural Resources, Materials Science, History, Civil and Environmental Engineering, Literary Criticism, Gerontology, Social Work, and Public Health, to name only a few fields which can be linked to the design of the built environment. By allowing students in other fields to enrol in these design studios, architecture students would be opened up to a variety of new ideas and ways of working. Faculties in other fields could also benefit from the experience by seeing architecture students in their own environment and by coming to understand the nature of architectural education. This understanding can only help to break down the misconceptions that have been perpetuated between architecture and the rest of academia.

Illustration 4.12 Tutor-tutor interrelation during a jury critic

4.2.5. Student-computer interrelation

Brett Steele observed that the computer becomes a 'team member' within each team- the mediator or intermediary for the project generation. It is used as a tool of expression during the design process. It acquires an important role within the process of design and becomes the node of articulation between various aspects and teams within the whole studio environment. There could be no design work done without the use of computer.

Through different computational techniques, the student communicates with his team members, as well as the tutors. These computational techniques can be classified in relation to the usage in different stages of design. As for technical drafting, softwares like; Autocad, Architectural Desktop, Archicad, Vectorworks are type of vectored based softwares. As for design development and modeling; Maya, 3d studio Max, Rhino, Artcam for CNC machining, Along with programs for presentations and diagramming like; Coreldraw, Adobe Illustrator, Indesign, Photoshop, Premiere, After Effects and Microsoft office programs, etc..From the formation of design knowledge through to the visualisation of 3d models, computer is the invincible device.

4.2.6. Computer-computer interrelation

The structure of a collaboration-based studio is based upon a computer-based network, where the speed of flow of information exchange is calculated by the speed of modems. The use of computers, allow new representational and design techniques to feed the process of design.

Computer networks allow convenient exchange of data between machines, and remote access to important online resources such as www and the main server of the collaborative studio environment. It also facilitates secluded and real time collaboration; using sophisticated communications techniques. Designers at different locations can work on the same text, spreadsheet, or CAD database while videoconferencing or design team members can work in different or instantaneous times on their projects. In addition, the memory and printers could be shared as well through the network. Mitchell & McCullough (1995) points out their view as;

> ''By combining computer and telecommunications technology humankind have been able to build increasingly extensive and sophisticated computer networks.''

In a typical 'client / server' network there is one large, powerful computer known as a file server; this acts as a central repository of information, and smaller machines connect to it to accomplish their work. You can have different computers with different tasks; for design issues, for web browsing, for word texts (Mitchell & McCullough, 1995).

Integrated design environment is one in which data files relevant to a project, software tools, and physical devices can efficiently be put to many different uses- possibly by different members of a design team, working in different places, at different stages in a design process - and exploited to the maximum. All the files and tools are organized in a way that they are accessible when they are in need of the design team(Mitchell &Mc Cullough, 1995).

Design team members become more productive once they have convenient access to up-to-date information (Mitchell & McCullough, 1995).

Computers are connected in some way so that they can communicate with other (Illustration 4.13). Hardware integration allows transfer of data files between application programs. Where a database can be accessed concurrently by different users and different processes, editing and updating must be coordinated carefully to prevent confusion and conflict. For this reason, some files might be locked, in order to prevent data lost. Files can be viewed as read-only to continue data exchange (Mitchell & McCullough, 1995).

Illustration 4.13 Zaha Hadid Architects design studio environment.

4.3. Studio Medium Correlations

After seeing the different studio structures, it is important to talk about some of the most important correlations that come out these design studio structures. Having always in mind, the individual for the discussion bases, some of these correlations

can be compared based on the design product, the working process, the psychology of the individual and the team and finally the design bases.

4.3.1 Design product of an individual / design product of a team

The product of a collaboration based design studio structure is most of the time very fulfilling by means of amount and the quality of the work, as well the design. As Laseau (1989) states;

> ''Because graphic thinking increases the output of ideas for the individual, the possibilities for a team are geometrically increased, assuming the way is opened for everyone to communicate.''

Design itself is considered in terms of process, rather than regarding the final artefact. Design process becomes a system of investigation, invention, and technique and the design follows an integrated process. Mitchell & McCullough (1995) explain the design process;

> ''Since design is an uncertain, trial-and-error process, it is usually prudent to save intermediate versions of an evolving project in case it is wanted to go back to them. The result, in general, is a tree of project versions- some of which are abandoned. Eventually, one of the terminal versions is accepted as the final design. Each version is identified, at least, by name and time of creation.''

In a collaboration based design studio structure, the amount of trials and new ideas is far more than an individual's (Illustration 4.14). From one project, there is the potential to create more projects. Some might see this formation of information as a problem. They think that the richness of the produced information creates chaos in the medium, and delays the route to the final design. However, a design medium should allow the maximum amount of research possibilities for evolutionary design.

In addition, there is a risk of not satisfaction of a team member of collaborative design teams. During the design process, one might not be satisfied with the outcome of the design product, as all the decisions are taken as the majority of a team. In that case, there can be some integrity problems of the production of the unsatisfied person.

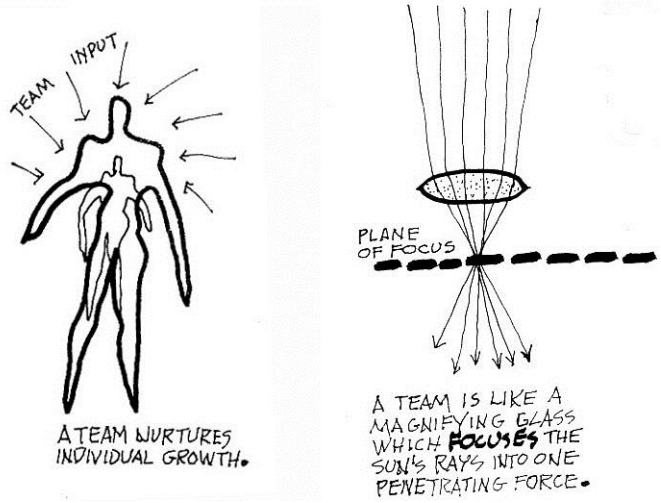


Illustration 4.14 Personal improvement and the amount of design outcome in collaboration based design studios (Caudill, 1971).

4.3.2. Individual work / team work

By the time, students begin their post-graduation education, most have graduated or have been working for a few years. The things they had learned through their undergraduate courses, mainly (and purely) is that there is a client, a commission, a programme/brief, a site (context), a budget (more for professionals), construction techniques, and formal and conceptual compilations, which can be named as the 'priories' of design. As an inheritance from architectural modernism, post-modernism, the design process comes from previous knowledge, which generates a sketch, a drawing, and consequently the project. However, when the students get into collaboration based design studio structure, the process considered as 'given' a priori is questioned and reversed. Nothing is given but only is there to discover through diagrammatic design. They become unacquainted of the possible outcomes of the process, as well as design.

A designer working individually on a project, has the problem of choosing which task to take up next, and ultimately of structuring the entire design process as a sequence of tasks. Whereas in teamwork (as everything), it is the teamt that defines the strategies for the upcoming tasks. As architects are not the sole decision-makers in building projects, which are becoming more and more complex with an increasing

number of hands in the pot. Architects, to be effective, must learn to work in team situations.

In a single designer working on a computer has no problem in following the track of versions of his design and their relationships in the version tree, but it becomes very complex with a multi member design team working on a multi-user system or in a network. In collaborative design, the version tree proliferates very quickly as each design team member creates their own versions in the initial state of the design process. Here the need for more precise description of versions and their relation to each other is important. For that reason, the process becomes more obvious in relation to the development of the version tree.

4.3.3. Psychology of the individual / team psychology

The design process has its enjoyable and stressful parts. According to Yavuzer (1980), in some stages of the design process, an individual can feel uncertain, down and insufficient. Mainly when the student is on the concept formation stage, he/she has many responsibilities on his/her shoulders. When he/she cannot find a main concept for his/her project, or when he/she is not inspired by anything, there is not many people that he/she can rely on. However, when it is the team working together, there is always a fresh idea or something to continue within the design process. For that reason, the members of the team gets support from one another having a stronger aim towards design. Busseri and Palmer (2000: 224) explain this by saying;

> ''In any event, members of a team accept responsibility for the design and strive to take part in all aspects of its development - in this way; each team member qualifies him or herself as a 'designer'.''

Generally, the designer gets to much identified with his/her own work. For that reason, it is always difficult to self criticise, evaluate, defend or approve oneself. However, in a team situation, the teams identify themselves with the work, so the individuals that form the team, find it easier to criticise and to elaborate the work in a more efficient manner. They can endure the critics in a more mature way comparing to an individual facing a critic (Illustration 4.15).

Illustration 4.15 Students supporting each other's ideas in front of a jury

As a team, students find it easier to defend their ideas and projects. They get support from one another. They stand in front of the jury altogether and fight for their ideas. If there is any problem of an individual of the team, he/she is backed up by his teammates. Whereas as, an individual you are always alone and you have to face everything by yourself. If you are not in your best day, there is nothing much you can do about it, as things are left untold or misunderstood.

From time to time, teamwork also has its difficulties (Illustration 4.16).

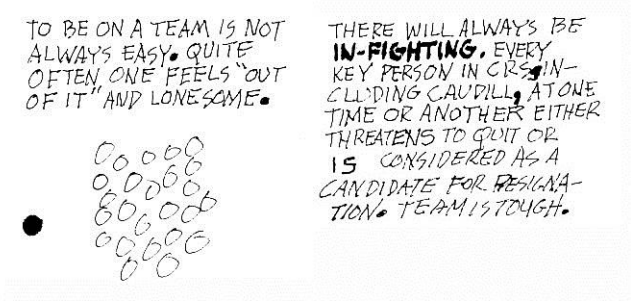


Illustration 4.16 The negative point on teamwork, in relation to ones psychology. (Caudill, 1971: 71).

4.3.4. Research based design / traditional design

In collaboration based design studio, the aim of the studio is to emphasize research in the design activities. In an individual based design studio, as the design is under one person's responsibility, he/she has to deal with himself/herself, giving answers to his/her expectations and should define his/her validities for the design. For this reason,

it is unavoidable that the personal norms and values are privileged. In collaboration based design studio, for the design to be valid, all the personal norms and values should be left behind. In order to achieve this, it is necessary to have the team design feeding on concrete basis in relation to information and data. Like this, the design reaches to a level, which is impersonal and totally objective. The way to reach design information could be through research. As in the individual based design studio or traditional design studio, research is only done through personal norms and values, therefore a predetermined and maybe sometimes prejudiced.

In collaboration based design studio, the design studio is not the end-all and be-all of an architecture school. There is a balance between supportive seminar courses implying theoretic backgrounds and the design studios. Hence, these supportive seminar courses are placed in the beginning of the design education, preparing a theoretical background for the student's designs, allowing them plenty of time to work on their projects.

The individual studio centred system, as it currently exists, focuses on the formal qualities of architecture, rather than its human ones and commands the hearts and minds (and time) of students, while the so-called 'support' courses often stay not related to the designs of the students. Pointing out that academics often claim that studio is the place where students synthesize what they have learned in other classes into their design solutions, though the connection between these issues and what the students design is seldom clear. The information contributing design through the supportive courses, for many cases might not be used directly, it needs to be transformed.

5. CONCLUSIONS AND DISCUSSIONS

The affects of the new developments in our era, is forcing architectural education to change. The majority of the recent meetings in between academicians, professionals and critics from all over the world expose this need. The change of the roles and the duties of an architect in public are demanding more from an architect. The product of architecture is becoming more complex, requiring teamwork for efficiency. By looking to the needs and according to all these changes within the profession, and looking simultaneously at the product of architecture, it is seen that the architectural education of an architect is becoming a challenging issue that needs to be improved. The current discussions on the architectural education structure of an architect focus on the problem of the lack of research during designing hence are stating the division of the profession into two as practice and research. The aim of the thesis is to expose one of the approaches towards architectural education to meet these needs of our era.

Collaboration based design studio structures is a proposal for the improvement of the architectural education. It is based on collaborative work, derived from a team of students who share common goals. It allows architectural research to be done throughout the design process, by using diagramming as a tool for design. Diagramming allows the distribution of research into the team by individual members through their duties.

The replies of the question one expose that the roles are defined according to the student's knowledge in design or their interest areas. The duties allow the team member to asses his/her skills and satisfy his/her personal interest. Through such a design experience the student always feel attached to the design and stay satisfied with the overall design process and grasped research. This is very important for success. The team members become fully aware of all the components of research while being engaged with their duties. Every member feeds one and another and the outcome of the project is the interaction of all the team members. Therefore, a

problem in one duty would be reflected to the overall project as a weak element, so every member in the team should be responsible for his or her performance in relation to the team performance. The roles and duties interchange or overlap depending on the requirements of the project. Depending on the replies of question 4, it can be said if everything is well organized and satisfying for everyone in the team, the roles do not change. However, if the work requires change and refreshment, the roles of the individuals change as a self-organized system. The organization of collaboration-based team happens naturally. The members establish their roles by being active and stating their ideas (question two). All the members own the design and there is not much of a hierarchy. The replies of question three show that the individuals have a strong sense of responsibility towards the project as well as towards each other, and the leadership change depending on the subject of discussion. The outcome of the project is mostly satisfying by means of amount of research that is being done and the development of personal skills. The replies of question 5-6 show that the design process is more fruitful comparing to individual based design process.

One should understand the difficulties of collaboration based design studios in intermediate years of the education, as these times are the ones that the students would develop their designer personalities. However, there is a need for such design environments in the upcoming years of the education, especially in the postgraduate education. By examining the benefits and difficulties of collaboration based design structures, it can be said that collaboration based design studio structure is an effective model for preparing the students for the practise world as well as research world (Table A.1).

For a research-based education in individual based design studio, an equal importance should be placed upon the 'support' courses while protecting the importance of the design studio. The way it exists now, in the example of ITU MTZ, the support courses have a dominant feature in the whole curriculum. By eliminating the hierarchical structure that exists within a traditional core curriculum, students will start to understand research to be a necessary part of their design process. Integrating the 'support' courses into the design studio by means of collaborative assignments, the students will be assisted in developing a research-based design

process. Through planning the whole programme considering the interactions of supportive courses and design studio, giving parallel tasks, and feeding one and other all the time, research based design could be achieved.

The marginalization of no design subjects in architecture schools is the beginning of the devaluation of elements vital to the existence and realization of architecture. This agrees that architecture is a fine art, [but] it is also a technology and an applied social/behavioural science in which architects make statements on the activity patterns, physiological needs and aesthetic preferences of people.

Using more participatory and community-based design subjects students could be taught how to participate effectively in decision-making processes and asking the right questions beginning and throughout the design process. By giving students a 'real' design problem with 'real' clients, they could be faced with the practicalities that most professionals say are sadly lacking in architectural programs today. Using design/build projects, students gain 'hands-on' building experience and develop their skills of working with clients. Working with laypeople not versed in an architectural vocabulary, students should also need to develop their verbal skills (both oral and written) so that they can express their ideas clearly and effectively. Today in many programmes, taking into account the difficulties of design education, the development of written skills is considered secondary to the students design studio activities. Students should be given the opportunity and be encouraged to develop their written skills. Despite of their importance, developing effective graphic skills is not enough to insure that an architect's ideas are being conveyed, the students should be encouraged so that they can use a variety of skills to relate their ideas to their clients and the community. Asking students to complete a written report before the design process takes place encourages students to 'do their home work' and present a clear and well-researched foundation upon which their designs can rest. A written report at the completion of a design project shows students the importance of using a variety of verbal skills to convey design ideas.

The ultimate goal of these studio reforms should be to promote integration within the curriculum as a whole, supporting that the goal should be to provoke confrontation among typically separated orientations. In collaboration based programs, studio,

theory, and practice learning is not isolated into unrelated courses, but connected in a way that works as a whole. Therefore solves many of the current complaints that focus on the inability of students to integrate what they have learned in technology courses into the design studio. As a result, students embrace technological issues as an inherent part of the design process. Introducing aspects of technology into the studio is one way to integrate it into the design process. Another is to teach technology as a design studio in itself, which is already being done. Teaching technology and professional practice courses as 'design' not only makes the material relevant, it also communicates to students the fact that everything an architect does is design.

Creating these new courses within the department provides greater opportunity for students to broaden their intellectual base and learn about a variety of areas of interest within the architectural community. These types of courses should be examined and evaluated according to their applicability to professional programs. Architecture students seem vastly unprepared to tackle even the most basic research problems. By providing courses which focus on the importance of research in the architectural profession and the fundamental methods of conducting research, students are better equipped to bridge the gap between the 'professional fields', such as architecture, and the 'research fields'. These courses can be team-taught by architecture faculty, their colleagues in other fields, and those specifically trained in research methods, such as reference librarians. Courses requiring a final research paper or practicum will give students more experience in presenting their thoughts in a clear written form, a skill that seems to elude most architecture students. As done in the example of AADRL, asking students to complete a thesis project (one which combines a semester of research with a semester of design) in a postgraduate course allows students to see the interconnectedness of their own research with a design problem.

Of course, measures that are more drastic can be taken to reform a postgraduate course. These require careful thought and a great deal of discussion among all those involved in order to coordinate the adjustments that invariably would need to take place. The primary emphasis in any reform should be to reduce the friction that currently exists between the design studio and the lecture courses. Reducing this

conflict will allow students and researchers to be more comfortable with the integration, which needs to occur in architectural education.

Principles should be integrated into the architectural program at those points where understanding of these principles will provide the foundation for the comprehension of their architectural applications rather than in a separate course specifically oriented for architects. Presenting material in this way would allow students to understand the design implications of a broader range of issues. One way to overcome the friction between studio critics and those who teach technology, materials, and professional courses is to make them one and the same by methods that specifically integrate technology and professional issues into the design studio. This, however, is a narrow view of what students need to know to work effectively within the architectural community. Studios and lectures could be combined along a variety of different topics, including design and human health, design and social psychology, and design and contemporary theory.

As observed in the example of AADRL, a modular structure of the syllabus allows related academic classes to be taught before, rather than simultaneous with, the studio course. In doing so, students gain the necessary information prior to beginning their design problem and be able to relate this material throughout the entire design process. By being able to focus on lecture courses without the time commitments of the studio, students are more able to focus on the materials being presented in those courses. By separating lecture and studio into two separate modules, the conflict between the two in terms of the students' time is eliminated.

The split semester can also promote innovation and team-teaching by freeing up the teaching load of those who typically teach lecture courses at a time that enables them to assist in the design studio, and vice versa. By having a shortened and more intensified studio, there is greater opportunity to bring in guest critics and to allow students to be involved in design/build and community-based projects. An additional benefit for faculty is that the split semester allows them to take 'mini-sabbaticals', where they can focus on their own research. It also provides time for faculty to work together to explore ways to integrate their courses and requirements. While the split

semester may seem like a radical approach, it is a way to address many of current problems.

To close down both ends more emphasis should be placed on theoretical speculation divorced from any notion of how architects and architecture exist outside of the academy. The focus is on architecture as a discipline, rather than as a profession. There is no reason for us to have to lose one for the sake of the other. Practitioners, educators, and students must work together to reconcile all of the varying, yet interrelated, aspects of the profession. This includes issues of research and practice in our field, as well as work in other related disciplines. We should all work to establish avenues of dialogue for the betterment of our built environment. Dialogues within our profession (between educators, students, and practitioners) and with those in other disciplines will provide the opportunity for the architectural profession (both educators and practitioners) to re-examine the nature of our profession and determine the appropriate direction for schools of architecture. These discussions can be initiated by setting up four basic goals:

1. Developing an intellectual foundation for the profession of architecture,

2. Promoting a curriculum which has a focus on other academic fields,

3. Supporting integration between studio courses and the core lectures,

4. Removing the hierarchical structure between master/apprentice, that exists in the current educational system

5. Encouraging collaboration based design between different levels assists the equal interaction among students.

Once these goals have been satisfied, the gap between research and practice will be diminished and the interdependency of the two can be explored. We must value research as an integral part of design. To be successful in the changing arena of architectural design, it is critical for architects to accept advanced research, not as an outsider but as a 'partner' in design.

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ATTACHMENT A_ QUESTIONNARIE SURVEY

1. What was your role in the design team?

2. How did you establish your role within the design team?

3. Was there a hierarchy within the design team?

4. Have you always taken the same role? Does it differ?

5. Were you satisfied with the outcome of the project?

6. How different do you think collaborative work is from your individual work?

7. Did you feel comfortable to present your work as a team more than an individual?

8. What are the benefits of collaborative design?

9. What is the most significant difficulty?

10. What were your relations with the studio tutors? Did their way of giving critics to the team work differ from the one of individual work?

11. Why do you think collaborative design is only appearing within architectural environments using contemporary techniques?

ATTACHMENT B_ ANSWERS OF THE QUESTIONS

Question 1- What was your role in the design team?

''Design, physical modelling, presentation, detail and material study, diagrams ...I would not call this role. It is team work.'' N.K.

''3dmax, flash ..'' J.C.L.

''I was most of the times in charge of condensing the information and bringing together the ideas for a clear presentation. The team relied upon me to organize and distribute the work load to get to the pre-established desired product while meeting the constant deadlines.'' G.R.

''Designer, animation, model making, graphic design, book publishing, poster design.'' S.H.

''I think because we only had 3 we had multiple roles and due to personal dramas that occurred during the course those roles changed; My primary roles: Physical model-maker, design/project strategist - what I mean is that at the end of phase 1 (without the OK of anybody else) I took on the role of thinking the project through, where it could go in the time we had left and how to make a coherent body of work out of a lot of disparate pieces. My secondary roles: Diagramming (Illustrator mostly and some Flash), back-up digital model maker.'' M.D.

''Usually being part of a team implies that there are no fixed roles but it changes as the design matures and needs change. In my team I did a little diagramming, some model making and conceptualization and some criticizing.'' N.G.

''Concept design, 3D modelling, 3D animation, mechanical modelling'' M.B.

''Multi tasks; designer, decision maker, presentation editor, book editor, model maker, visualization.'' A.T.A.

''Our team was a collaborative effort with a delegation of roles based on skill sets. All members had several 'roles' or specialties. I worked mainly with conceptualization, organization, presentations and publishing of output.'' J.J.

''I normally start presentation of my team and I refused to do any 3D Max and Maya simply because I don't want to learn it.'' M.W.

''3D modelling/ rendering/ scripting, prototype operating system'' M.P.M.

‘‘3D modelling / animation / flash (presentation / diagrams) / layout.’’ M.I.

‘‘I focused much of my work on scripting and behavioural development.’’ A.H.

‘‘Team member." F.B.

‘‘Model builder, text producer.’’ A. B.

‘‘3D modelling, diagramming, physical modelling.’’ S. N.

‘‘3D modelling, animations and conceptual theory.’’ F. F.

Question 2- How did you establish your role within the design team?

‘‘???’’ N.K.

‘‘I didn’t know max nor flash when I got to the drl; I think time and different needs would just make you choose a role. Not other in my team knew max or flash and some people just can’t learn.’’ J.C.L.

‘‘Quickly we found the specific knowledge and special interest each one of us had in terms of the line of work we could and wanted to undertake, and we developed skills (mostly digital tools) in a more specific way related to the work.’’ G.R.

‘‘Democratic process, self organised and agreed by consensus.’’ S.H.

‘‘Physical modelling; I came to the course with the skills and said to the team ‘This is what I’m good at ...’. Project strategist: At the end of phase 1 I left unhappy with the work we’d done and the lack of direction we had. While I worked on one part of the project, I thought through possible strategies and directions for the project. I wrote it all down and presented it to the team and that was the direction we ended up taking,’’ M.D.

‘‘My role came about cause of need. Everybody else had worked that they had proved that they excelled at. Being the new person, I just filled up the holes.’’ N. G.

‘‘By assigning tasks within the team, based on expertise or commitment.’’M. B.

‘‘Stay active.’’ A. T. A.

‘‘Hard work and constantly bringing new work and ideas to the project.’’ J. J.

‘‘By speaking out boldly about your concepts and illustrated them clearly (or shall I say convincingly).’’ M.W.

‘‘Natural selection, self-organization.’’ M.P. M.

‘‘Each team member naturally chose the medium of preference, and other tasks were split as needed.’’ M.I.

‘‘The roles within the team were fairly self-organized ..as each individual assumed the roles and responsibilities that they each made the most progress in, and felt the most comfortable with. Clearly, those with a better grasp of the English language became more vocal, and therefore more influential.’’ A. H.

‘‘Ideas, workload, arguments.’’ F. B.

‘‘I guess that happened according to talents and knowledge of specific software.’’ A. B.

‘‘Assessment of skills over a certain period of time after the team is formed. Was also based on personal interest in a particular aspect of the project.’’ S. N.

‘‘It was establish according to the team knowledge of my capacities.’’ F. F.

Question 3- Was there a hierarchy within the design team?

‘‘No.’’ N. K.

‘‘I think each of us was good at one specific thing, therefore everyone was important.’’ J. C. L.

‘‘More that a hierarchy, there was a strong sense of responsibility with one another as with ones own work, a very defined division of tasks. The lead could be a shifting position depending on the nature of the work being developed.’’ G. R.

‘‘Sometimes, not for most of the time’’ S. H.

‘‘To all outside the team ‘yes’. To those inside the team ‘no’. We all lead the way at different points and in different ways.’’ M. D.

‘‘Always. But it was an unstructured hierarchy and the ‘leader’ changed within the team as the topic of discussion changed. The person heading a particular function naturally became the head of the team during the period of discussion of that function.’’ N. G.

‘‘Not in the beginning but once a sort of procedural network was established thinks work better.’’ M. B.

‘‘Nope. But there was a guy who was less involved, so obviously less trust lead to less responsibility.’’ A. T. A.

‘‘Yes.’’ J. J.

‘‘There was indeed hierarchy in the team but the truth is not all team members realise that and it is difficult to state or speak out who is at what status ...after all we are suppose to be equal.’’ M. W.

‘‘No, the 4 of us had a competitive position in the decision making process, but all the research information where shared in real-time within the team.’’ M. P. M.

''Sometimes.'' M.I.

''Though we would like to say that there was not a hierarchy within the design team, there definitely was one. As stated previously, that hierarchy was clearly one that was influenced by level of English.'' A. H.

''Mostly no." F. B.

'If so than only informal.'' A. B.

''No.'' S. N.

''There wasn't a hierarchy, but instead it was developed an exchange of information according to each element's duty.'' F. F.

Question 4- Have you always taken the same role? Does it differ?

'It differed at certain times. As it is teamwork ..'.' N. K.

''Mainly yes, but from time to time you overlap roles.'' J. C. L.

'If this question refers to previous academic work carried in teams, no. I had worked previously in small teams but roles were established again according to skills and that is constantly changing depending on the nature of the team coming together at one time with a particular goal to achieve.'' G. R.

''The role always changed but I did the majority of the animation as I had previous skills to the course.'' S. H.

'I have always been a modeller, I always seem to find myself in that role and I enjoy it. It doesn't differ but it does develop - eg now my modelling has a digital component. I had never before taken on the role of a project strategist. As it turns out I am spending more and more of my time in this role and this too is developing. So it seems to work that I am involved in thinking strategy through and then playing the role of modeller in the team that follows the strategy through.'' M. D.

''No, the role changed during the design process.'' N. G.

''The roles had quite a bit of overlapping but in the end it was better not to drill to deep into other team member's core business. Although it was important to criticise each other but not take over other people's task (... but I could think of emergency situations where it could happen).'' M. B.

''The same.'' A. T. A.

''No roles were based on needs at a particular time. If we needed to produce a model we had a main person in charge of who did what for that particular part of the project. Same with all other aspects of the project.'' J. J.

''Pretty boring answer ...more or less doing the same thing all the time.'' M. W.

''My role evolved within the team through time.'' M. P. M.

''Not always, depends with which team I was working.'' M. I.

''I usually took on the same role within the team, though roles were often changed.'' A. H.

''Yes.'' F. B.

''For less important stages of the project the roles where switching at times, but for the big and final products the role remained the same.'' A. B.

''No. The general success of the project depended on the ability to shift roles according to situation.'' S. N.

''Basically, yes, but as it is teamwork the role was redirected to the needs of the project.'' F. F.

Question 5- Were you satisfied with the outcome of the project?

''Yes and no.'' N. K.

''Given the circumstances, yes.'' J. C. L.

''Yes.'' G. R.

''The outcome was better that I expected but I also wanted an improved outcome in some areas - some of the decisions by other members of the team made the project too broad.'' S. H.

''Yes and no. Physically 'yes'. Digitally and architecturally 'no' - it could have been much more.'' M. D.

''Yes. It always could be different, but in that time period and with that particular knowledge and maturity we did the best that we knew'' N. G.

''It could always be better. It didn't really develop its own life to a full extend.'' M. B.

''Yes, in the DRL. No, in the AA'' A. T. A.

''That is an impossibility, but I felt we did a good job.'' J. J.

''Not exactly, but no one should be blamed but myself.'' M. W.

''I am satisfied with the outcome of the research process, the creation of new tools and mechanisms for design.'' M. P. M.

''I find the process more interesting, even though, since the outcome was something that in our case appear late in the course, it was quite exiting, even if we didn't manage to develop it as much as I would've liked to.'' M. I.

''Overall, yes, although not entirely.'' A. H.

''Conceptually yes.'' F. B.

''Not particularly.'' A. B.

''Yes.'' S. N.

''No, there were design elements which in my opinion should be approached in a different mode. Nevertheless, this negative point was the reflection of a less accomplished, inner organization and communication within the team.'' F. F.

Question 6- How different do you think collaborative work is from your individual work?

''It is the outcome of time and stress, could be mentioned as nonlinear.'' N. K.

''Very different, but doesn't mean better or worst. It just takes to much time to agree on something. And there is always someone that doesn't work as hard as the other … and if you have more than one in your team, you may be on a big risk.'' J. C. L.

''It can be more versatile at times since there is always something alien from you put into the design while working in a team.'' G. R.

''Specialization means that the final project is more thoroughly researched and presented but the outcome is not homogeneous and clear.'' S. H.

''In terms of results: The work produced has the potential to be more rounded and complete, fuller and with more depth. In terms of the process: Specialisation rather than generalisation is fundamentally different in terms of how we spend our time and the types of knowledge that can be generated. Sharing information amongst collaborators helps everybody learn quickly and effectively. Personally: collaborative work is more stressful and frustrating but ultimately more satisfying because of the (potential) quality of the results and the depth of knowledge in specific areas that collaboration allows you to develop. Professionally: It builds bridges and alliances that may ultimately be useful and fun. I am much happier working in teams. Individuality is limiting.'' M. D.

''Very. The complexities within the work are much less in my individual work. On the other hand I often debate that collaborative work is often mediocre. There is no chance of complete failure or moments of eureka. It is always just right.'' N. G.

''Collaborative work has only a chance if it has some kind of teamspirit culture or comprised a team of experts (Rock band or Space-Shuttle crew).'' M. B.

''A lot of idea compromising, lead to idea repetition (sterile within the research team?). Much more exhausting procedures for decision making.'' A. T. A.

''Collaborative work requires a more precise definition of the goals and objectives of a project for it to be efficient. The dialogue/argument within the collaborative project is an important tool for refining the quality and clarity of a project. Collaborative work also necessitates a continuous definition of the boundaries of both the project and the collaborators' position within the project. I think this frees up team members to develop areas of expertise and to challenge one another in a positive way.'' J. J.

''Very different, you don't really argue nor getting angry with yourself that much, do you?'' M. W

''You improve much faster as you have more people trying things, and more ideas to work on, you just have to invest some time in managing the team.'' M. P. M

''Very different.'' M. I.

''Collaborative work is very different from individual work, as you also must rely on others to contribute, be able to resolve differing opinions, manage a distributed workload, and learn to trust in others.'' A. H

''Essentially the work becomes a multiplicity.'' F. B.

''It is a pain to bring the ideas together. Since there is no hierarchy and no one really makes decisions with a straight vision it is always a mix with the danger of having no concept ..'' A. B.

''Decisions are generally made based on majority. Also, quality/quantum of work is not sometimes consistent.'' S. N

''Collaborative design is, in my opinion, a negotiation of ideas, some you think of them and some you are unaware or unacquainted with. This is the major difference I find comparing it to individual work, in which you already know what you are going to do or going to focus on. The successful outcome of team design is depending in how well achieved is the communication and transition of these concepts within the team and consequently how they will nourish the project.'' F. F.

Question 7- Did you feel comfortable to present your work as a team more than an individual?

''Yes.'' N. K.

''If your work is good, then it doesn't matter.'' J. C. L.

''Yes, the result was clearly a good team work.'' G. R.

''I was happy to present the work both as a team and individually.'' S. H.

''Ultimately I'm happier presenting as an individual (despite what I've said above). Can't explain that.'' M. D.

''Yes. The level of confidence when there are a few more people involved is higher but then so are the opinions and styles of presentation.'' N. G.

''As an individual it is easier to fudge something or to cover it in smooth-talk. Presenting as a team you really have to have the work to back it up. But it is just a minor difference.'' M. B.

''No.'' A. T. A.

''Not always.'' J. J.

''Don't mind really, although I must say there will be pressure while presenting other people's work since although it was the same project but you don't really understand all parts of it and you don't really want to eat your own foot.'' M. W.

''I would prefer to keep working in a team.'' M. P. M.

''Not necessarily. I would've liked more individual instances, they should both be present.'' M. I.

''I felt quite comfortable presenting either within a team or as an individual.'' A. H.

''No.'' F. B.

''It is difficult to sell something you do not support to the last part ..'.' A. B.

''Yes.'' S. N.

''Yes, although the explanation for this lies on that you only feel more comfortable if you and the team believes in the project. However, if the opposite emerges it is also more awkward, and this is due to the fact that somebody is exposing something for you, in which, if you subsequently are confronted with you find your self defenceless, putting the whole work at risk.'' F. F.

Question 8- What are the benefits of collaborative design?

''Fun.'' N. K.

''Ideas interchange.'' J. C. L.

''Again, the richness that can be put into the work comes from the input of several different opinions and ideas, and the ability to synthesize the mint o something legible and still original.'' G. R.

''Through research, complexities of interests, great depth of research.'' S. H.

''It is more real life. We all have to work in teams.'' M. D.

''Learning curve is higher. Complexities in ideas. Different interests in the same design can be pursued. Amount of work is much more so more time to experiment and pursue radical thoughts.'' N. G.

''It is just great, if it works.'' M. B.

''It is beneficial if it's happening between cross-disciplines. For example, a team composed of an architect and a structural engineer, or an architect and a programmer. If it's between architects, there needs to be hierarchy. Otherwise, you need a strong chemical reaction.'' A. T. A.

''More complete projects (in terms of varied levels of info), distributed areas of expertise and skill, more realistic in terms of how projects occur professionally.'' J. J.

''Less work would be produced when working on my own, surprising ideas and people started to tie together over a period of time, some sooner and some later but at the end of the day, people start to have similar thoughts which really strengthen and consolidate decisions and ideas.'' M. W.

''As above.'' M. P. M.

''It is just another form of design, I believe the benefits are reflected in the production (not in the quantity, but in the different approaches towards production) and of course in the ideas and discussions that generate the design.'' M. I.

''Clearly, collaborative work is how the ''real world'' works. No one project is ever completed by a single individual. Collaborative design allows for internal critiques and reviews to occur throughout the design process, and prevents the sometimes limiting perspective a single individual may have. In order to implement an idea, one must first be able to argue that idea and defend it within the team. Team management is another invaluable skill.'' A. H.

''Enriched spectrum of thoughts and ideas; bundling individual strengths to achieve a more profound work ..'' F. B.

''Much more productive materials at the same time though, a lot of nonsense happens through endless discussions.'' A. B.

''The output is generally thought through more than one mind. Also, there is the opportunity to fine tune individual skills while the project is in progress.'' S. N.

''The multiplicity of ideas inserted, simultaneously with the capability of sweeping more accurately a wider range of aspects inherent to the project.'' F. F.

Question 9- What is the most significant difficulty?

''Communication.'' N. K.

''Getting along enough to get the most of it.'' J. C. L.

''Meeting a common ground or line through which the work is to be carried on. Basically, the communication of individual ideas towards the agreement of a desired end product is the defining point of the team work.'' G.R.

''Hierarchy, agreeing to shared outcomes.'' S.H.

''The stress and frustration of relying upon other people.'' M.D.

''The ego. And as I said earlier there is the idea of democracy. This often does not allow some 'could be brilliant' ideas to grow'' N.G.

''Getting the team to work as a team and finding ways to proceed if it doesn't happen.'' M.B.

''Decision making, If there is a problematic member, babysitting'' A.T. A.

''Uneven levels of commitment and motivation.'' J. J.

''There were a series of unfortunate disputes within my team…even though the ones who were not involved in such actions were still affected emotionally since if 2 argue, you team is 2 men down …then you started to worry and how can you feel comfortable while working in such hostile environment .:.'' M. W.

''Having all the team focused on a common goal.'' M.P. M.

''Getting people to agree, to have a balanced distribution of tasks, to achieve an equal level of responsibility and commitment among all the members.'' M.I.

''The most significant difficulty is dealing with varying levels of skill and technical ability along with different levels of interest and dedication.'' A. H.

''A constant negotiation between all team members is necessary; a talent to perceive a variety of ideas different from one's own as a catalyst to propel the project into qualitative heights else impossible.'' F. B.

''Decision making process.'' A. B.

''Arriving at conclusions. Architects with different schooling/working backgrounds tend to promote personal agendas.'' S. N.

''Communication is the most significant difficulty, and so it is the biggest asset.'' F.F.

Question 10- What were your relations with the studio tutors? Did their way of giving critics to the teamwork differ from the one of individual work?

''No.'' N. K.

''The only thing I could say about this is that the image of one person can damage the image of the whole team.'' J.C.L.

''Critics were a guidance of the work. But the most drastic critic came from within the team, and that was the one that drove the work.'' G. R.

''Senior tutors for our team were also non-existent in the final two terms - there is no difference between critiquing a team or individual.'' S. H.

''Good with some, not so good with others - good overall. Not often enough though, and it was a bit 'one-way' a lot of the time, them pushing their agenda and talking 'at you' (rather than 'to you') rather than letting you develop it or developing your own agenda. Their way of giving critics to the teamwork was very different from the one of individual work. I hated not being able to speak in team crits, as if we (lowly students) had nothing to offer each other. And that allows them to push their agenda even more. But then some of us needed that kind of direction.'' M. D.

''I cannot answer that. I do not know how they would criticize individual work.'' N. G.

''In a way it was less personal and more and more about the work than I experienced it in individual tutorials. But in the end are more acting as coaches not in the sense that they tell you how to structure the team or the work but in terms of asking questions about the work that could only be answered through a collaborative approach.'' M. B.

''Yes, there is less personal development. Discussions tend to just focus on the work.'' A. T. A.

''Same as in most situations, only the expectation of work quantity was different.'' J. J.

''Not exactly apart from the fact they sometimes see the works as not being collaborated properly, or they simply didn't look like they come for the same team... which I haven't received such comments before I joined the DRL.'' M. W.

''The tutors where good critics of our work, they didn't really teach us much, but helped us focus on our goals, I think they could have provided a more effective technical and financial help from companies interested in what we where doing.'' M. P. M.

''Depends on the tutor, I would've liked a more constant relation with the tutors, in our case it was very sporadic.'' M. I.

''The relations with studio tutors were quite good, in a personal sense. However as a team, we often felt that certain tutors needed to edit their critiques at times. Others we felt were great however were not around quite enough. And some we felt gave comments that piqued quite a bit of interest yet contained very little substance.'' A. H.

''No idea, since there was no individual work.'' F. B.

''Tutors often were lacking concentration. Very seldom there was a serious and

helpful critique. Usually it was only team therapy or to get a higher instance sentencing the design direction ..'' A. B.

''In a research-based environment, tutors find it difficult to emphatically express their opinions. This tends to keep projects open-ended and sometimes lose. Second part of question, NO'' S. N.

''I find the relation more levelled. Maybe due to the big amount of presented ideas the communication has to be more direct, which takes you to a level of tutor/student relation instead of the classical professor/student in which many things stay untold.'' F. F.

Question 11- Why do you think collaborative design is only appearing within architectural environments using contemporary techniques?

''I don't believe this. Digital studios are still one identity formations. It was team 10 or archigram that was different, collaborative etc. Eisenmann or UN studio, those are not collaborative. May be Servo, and the other that I forgot the name teams are collaborative teams and I don't know their work ...'' N. K.

''In a way, it allows everyone to start from the same level of knowledge.'' J. C. L.

''There are two things here; collaborative design, I believe, can be present without the use of contemporary digital techniques. The fact that these techniques facilitate and bring a level of efficiency in the communication and progression of ideas makes them a relevant tool in today's collaborative design. Collaborative design is and has been part of the architectural practice not only between architects but as an interdisciplinary collaboration with engineers and general consultants within a design team.'' G. R.

''I don't see the collaboration is an outcome of contemporary techniques but rather an outcome of teaching and practice - it is easier to critique 11 teams rather than 44 students and the practice of architecture means that most projects that architects do require a team of many people.'' S. H.

''Traditional techniques operate in traditional environments. The master and the servant, employee/employer relationships don't support collaboration in the minds of most. Especially the older generation who are for the most part in the position of employer. Architecture is notoriously ego-centric, everybody thinks they have a better idea than the other guy (see what I've written above!) So having got into the position of being an employer why would you share the leadership with others ... unless you realise that they have something to offer you that you don't have or is particularly beneficial to you. But then you don't have to share with them - you employ them and exploit their skills whilst making them feel that you are doing them a favour by employing them, that they are worthless so that they will work for little or nothing and never leave - a traditional economic and employee retention policy. Younger people use newer techniques which (I believe) require greater degrees of specialisation. For that speciality to be worth something usually it needs to be combined with other specialities - everybody needs everybody else in order to be

useful. I believe this creates a level playing field where everybody is valued for their contribution = perfect for collaboration.'' M. D.

''Collaborative work has been around in nearly all fields and in architecture under different names and with no relationship to contemporary techniques. Architects have collaborated with structural consultants, artists, sometimes performance artists etc.'' N. G.

''Sorry, but that is a myth! The school I studied as an undergrad in Germany supports collaborative work since the early 70s (University of Kassel). And I think if one looks back at the AA history tutors tried all sorts of collaborative and individual work (i.e. Peter Wilson) within the unit system long time before the advent of 'contemporary techniques'. They do help but just as much as they do help individual work.'' M.B.

''Sorry, I don't quite understand. Contemporary needs to be defined; examples with comparison might help.'' A. T. A.

''This is not in fact the case. Many programs use a collaborative model. It is neither new nor unique to 'contemporary' programs.'' J. J.

''I don't agree on that, or maybe I don't understand the question fully ...sorry, could help you on this.'' M. W.

''Of course not, architecture will always be a team effort because of the scale of its implications.'' M. P. M.

''I don't think it only appears within architectural environments using contemporary techniques. But it certainly encourages it, provably because it is very easy to share material; the medium somehow gives a completely different notion of appropriation towards the production material.'' M. I.

''Though I don't believe that collaborative design is only appearing in contemporary design (I have participated in many other collaborative design projects) ..it is clearly an issue of the technology and the network. Through the use of information networks, information can be exchanged around the world at a rapid rate. Another factor is that with modern software applications, numerous people could be working on a single file at the same time. Whereas, it would be literally impossible to think of numerous individuals drawing on a single hand drawing at once.'' A. H.

''I'm afraid this question contains a flawed perception of architectural practices, i.e. architecture without collaborative design is virtually impossible.'' F. B.

''I think it has to do with fanciness. But on the other hand at the University of Kansas they regularly do team work in the fourth year apart from computer and its fanciness. So I do not think this statement "11" is correct!'' A. B.

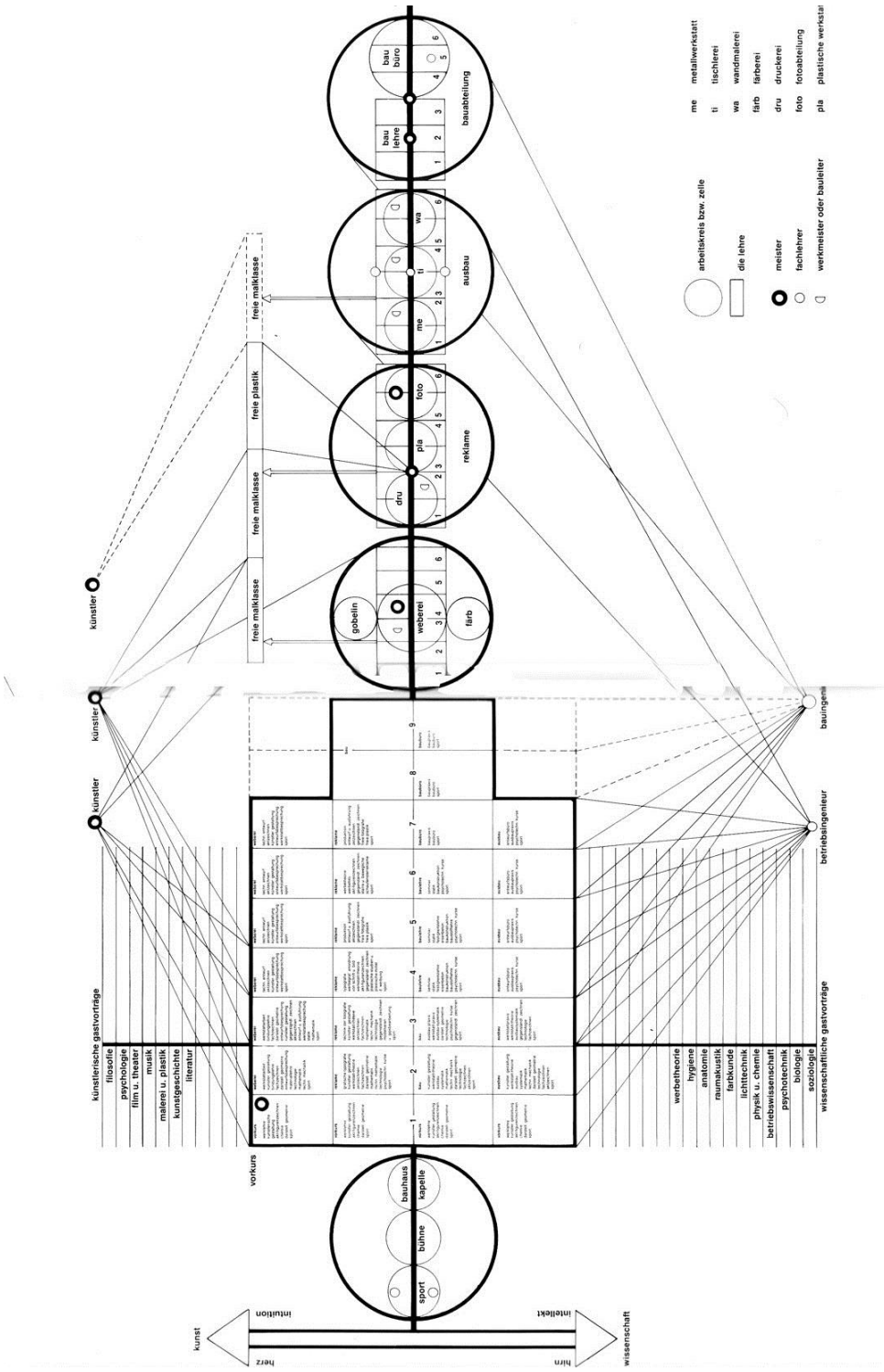
''Do not think this is necessarily true.'' S. N.

‘‘No I don’t think is that linear. If we take a closer look, collaborative design exists in architecture since the Renaissance, between architect, engineer, constructor and artist at an embryological level and has been evolving since then. The difference is that we are in the 21st century and the architect by himself cannot master all the techniques adjacent to the field of architecture, which makes him seek collaboration in multiple stages of the project and consequently taking to the highlight the issue of collaboration in design.’’ F. F.

TABLE A1._ Negative and positive points of collaborative work

[+]	[-]
personal &project improvement much faster	more time needed for agreeing on design decisions, exhausting procedures for decision making
final project is more thoroughly researched &presented	outcome is not homogeneous &clear
interaction between members allow fast &effective learning	uneven levels of commitment and motivation in between members; relying on others
more satisfying because of the quality and variety of design	quality/ quantum of work is not always consistent
life long alliances: useful &fun	much more complexities within the work
encouraging	more stressful &frustrating
no chance of complete failure, it is always just right	investing time for managing the team
the work becomes multiplicity	danger of having no concept
ideas interchange.	risk of idea repetition
more like real life	unsatisfied ego

ILLUSTRATION A1_ Bauhaus Organization Scheme, (Droste, 1990).



CV

Born in 1978, Istanbul, Muge Belek Fialho Teixeira is a young research assistant in ITU Architecture Faculty Interior Architecture Department. Following her first MArch degree at Architectural Association School of Architecture in the year 2004, she was invited to work with Zaha Hadid Architects Ltd., for two months on some of their competition projects. She has completed her architectural degree at Istanbul Technical University in 2000. Both during her studies and since her degree, she has worked in several architectural firms in Istanbul, London and Brazil on competitions, residential and commercial development and refurbishment projects. Currently, she is an active member and one of the founders of Warp Design Studio that is a design research platform.